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THE

PRINCIPLES OF SURGERY,

AS THEY RELATE TO

WOUNDS, ULCERS, AND FISTULAS;

ANEURISM AND WOUNDED ARTERIES; FRACTURES OF THE LIMBS; AND THE DUTIES OF THE MILITARY AND HOSPITAL SURGEON.

ALSO,

A SYSTEM OF SURGICAL OPERATIONS,

CONTAINING

The Principles of Surgery,

AS THEY RELATE TO SURGICAL DISEASES AND OPERATIONS.

AND

A SERIES OF CASES,

CALCULATED TO ILLUSTRATE CHIEFLY THE DOCTRINE OF TUMOURS, AND OTHER IRREGULAR PARTS OF SURGERY;

And to instruct the Young Surgeon how to form his Prognostics, and to plan his Operations.

BY JOHN BELL, SURGEON.

IN THREE VOLUMES.

ILLUSTRATED BY ONE HUNDRED AND SIXTY PLATES.

VOL. II.—PART I.

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TO

HIS GRACE

H E N R Y,

DUKE OF BUCCLEUGH, *&c. &c. &c.*

WHOSE PRIVATE LIFE IS AN EXAMPLE;

WHOSE UNOSTENTATIOUS, BUT EXTENSIVE CHARITIES, ARE A BLESSING;

WHOSE PUBLIC VIRTUES, IN TIMES OF DISQUIET AND ALARM, HAVE BEEN A SUPPORT AND SAFEGUARD TO HIS COUNTRY;

THIS VOLUME IS PRESENTED,

AS A TESTIMONY OF RESPECT AND ESTEEM,

BY

THE AUTHOR.

PREFACE.

This is not a book of amuſement, but of inſtruction in a practical art, and I am conſcious that I meet my reader on very different terms from one who enters on a new enterpriſe in literature or general ſcience. In my own profeſſion, in ſubjects which I have ſtudied, both in books and at the bedſide of the patient, with perſevering induſtry, I may preſume to divine the wants of the younger part of my profeſſion, and may hope to deliver in plain and ſimple language, deſcriptions of diſeaſe, and rules of practice ſuch as men of experience and good ſenſe will acknowledge and receive. Queſtions of ſcience I hold it to be my privilege and indiſputed right, to diſcuſs with unlimited freedom: Having no maſter but my own diligence, I owe allegiance to none: But I have ever cheriſhed an enthuſiaſm for the ſcience to which I am devoted, and a ſincere reſpect for my profeſſion; and this feeling, which has been my ſupport in compoſing this ſyſtem of operations, brings with it, now that I am to ſubmit my work to the public judgment, many inquietudes. I muſt have felt little of this reſpect, or have profited little by ſuch feelings, if I had not, in entering upon a work ſo important, and ſo extenſive, reflected upon the plan of it, with all poſſible deliberation, and purſued my labour with anxiety and diligence, if I did not now preſent it to my profeſſion with unaffected

diffidence. To conceal the ſatisfaction I muſt naturally feel in having completed a long expected book, would ſavour more of hypocriſy than modeſty; no one ſurely, enters upon a taſk of this nature without the hope of being conſpicuouſly uſeful, and cruel ſhould his feelings be, if, after having beſtowed labour ſuch as I freely acknowledge to have beſtowed on this book, he were to ſink under a ſenſe of ſelf-condemnation; but to imagine ſuch a book perfect is a thought ſo vain and puerile, as I believe my worſt enemy will not accuſe me of. Without affected humility or miſplaced apologies for ſtile or manner, I proceed to claim that indulgence which I know I need: there are I fear, many faults in this work, which even my beſt friends and the trueſt lovers of ſcience will be ſenſible of: but a book once publiſhed, is like a life come to its final conſummation, irrevocable, needing no apologies, if generally good, admitting none, if it be not ſo. Whether I have been fortunate in the ſelection of my plan! whether the clearneſs of my explanations will juſtify the extent of them! whether my common ſtudies of anatomy and of ſurgery have enabled me to transfer from the one ſcience, what may prove uſeful in the other! whether a habit of combining thoſe two departments has ſuggeſted to me happy ſolutions of the difficulties of the ſcience, and good rules for operating, the profeſſion muſt decide: I make my appeal from the criticiſms of thoſe who have their purpoſes and their parties, to a profeſſion learned and liberal, and too widely diffuſed to feel any influence.

I have ventured to give a ſplendid form to a book of ſcience, and thoſe who love that ſcience as I do, will not be offended. I have preſumed to entitle this work, not ELEMENTS OF SURGERY, which implies a ſhort enumeration of diſeaſes and operations, but PRINCIPLES OF SURGERY, which implies ſuch a combination of anatomy,

pathology, and ſurgery, as may enable a man, not merely to perform inciſions or heal the wound he has made, but to reaſon upon the phænomena of diſeaſe, to prognoſticate, to decide and to operate. Pathology, in this part of my ſyſtem, is made the baſis of all reaſoning on the cauſe or conſequences of diſeaſe; and anatomy, the ſole rule of every operation; while hiſtory occaſionally introduced, ſerves to illuſtrate thoſe rules, and to confirm the young ſurgeon in the love of his profeſſion, by demonſtrating its ſlow progreſs and preſent improved ſtate.

The main purpoſe of this work is to connect anatomy with ſurgery; to remind the ſurgeon, already engaged in practice, of thoſe parts of anatomy which he is ſo apt to forget; to ſubmit to his review the hiſtory of operations, that he may make his election with the confidence of one who knows the ſources of knowledge, and who reaſons from the only ſure principle, the ſtructure of the parts diſeaſed: how I conceived ſo bold a deſign, which look like innovation, or preſumed to think myſelf capable of ſo great a taſk, I ſhall now endeavour to explain.

To ally anatomy more cloſely with ſurgery, to connect the art more intimately with the ſcience from which it flows, ſeemed to me a taſk as yet imperfectly accompliſhed and yet of the very higheſt importance.—The ſtudy of pathology contributes not merely to make the ſurgeon intrepid, bold, and ſkilful, but to keep alive thoſe ſentiments which give a peculiar value to his beſt and moſt ſacred duties. The continual reference of every ſymptom and ſuffering, to certain phyſical changes going on within the body, begets a lively ſenſibility for the feelings of the patient while he lives, or to his fate when life is in danger. The frequent reaſoning on thoſe changes, produces a talent for obſerving the courſe of diſeaſe,

and a calm, ſober, and ſerious turn of mind, not unfavourable to prompt deciſion and manly readineſs in circumſtances of preſſing danger. The ſurgeon who is ſkilled in prognoſtics, and familiar with the ſigns of danger, who is well perſuaded of the neceſſary and urgent motives which engage him in difficult operations, who is conſcious that he inflicts pain only to prevent long ſuffering, or endangers life only to preſerve it, can know no taint of fear. Without this ſcience to intereſt our feelings in every new ſcene of affliction, our profeſſion would be coldly practiſed: without this ſtudy of cauſes, and a continual ambition to come to every new conſultation, with new acquirements of knowledge, new precedents, and more deciſive facts, profeſſional men would languiſh in the purſuit of ſcience: without this philoſophical view of the parts and functions of the living body, practice is not experience, and gray hairs and length of years beſpeak only ſtubbornneſs in prejudice, and ill-founded claims of deference and reſpect.

Experience is obſervation founded on previous knowledge: but to prepare the mind of a young man for receiving the leſſons of experience, he muſt have the ſcience ſo digeſted, and its principles ſo diſplayed by the teacher, as to perceive, in one view, the natural and healthy ſtructure of parts, the changes produced by diſeaſe, the probable iſſue of thoſe changes, and the remedies and operations by which ill conſequences may be prevented. Such principles every man of real experience, founded on knowledge, treaſures up, perhaps unconſciouſly, in his own mind: But his knowledge is the ſlow acquirement of years paſſed in doubts and perplexities: very rarely are the principles of ſcience unfolded to the younger part of the profeſſion, ſeldom is the ſurgeon ſent abroad into the world with that fullneſs of knowledge or maturity of judgment, which he might

be taught to derive from a knowledge of anatomy, combined with the experience of individuals, accumulating through ages.

The present mode of teaching anatomy, tends little to excite this spirit of observation: He will have little sympathy with the pains or suffering of his patient, who does not reason on what is going on within the body, who does not watch incessantly the symptoms indicating change, whether towards health or disease; and feel more fears and anxieties than his patient can imagine, and see dangers of which his friends cannot be conscious. Such reasoning repeated from day to day, is truly experience: The mind thus occupied in reasoning, not upon an abstract philosophical question, but on one which involves the fate of a fellow-creature, must be inspired with sentiments which they who know not our profession, nor the best motives which excite us to diligence, believe paralysed and deadened by frequent scenes of misery.

Anatomy, far from being taught for so noble and useful a purpose, is taught as a task of the memory, and its applications, various and interesting as they must be, remain still problematical. Anatomy is not made interesting to the pupil as the basis of our reasoning on disease, the rule of our prognostications the sole guide in operating: he is taught to know the parts and remember their names, and then he is dismissed from the school; and of this school we all are pupils, abandoned early in our career, left to learn in the hurry of practice, the very principles of the science.

The anatomy of surgery differs widely from that taught in schools: it were better the young surgeon had no conception of the forms of parts, than such as must be corrected by sad experience; for the parts of the human body are presented on the table of the anatomist, not only in circumstances, but in forms, in which they can never

at any after period appear to the ſurgeon. If the bones are demonſtrated, they are not diſplayed clothed with their muſcles, and connected by their perioſtæum with the ſurrounding parts: they are not repreſented as parts of a living ſyſtem, nouriſhed by veſſels, and ſubject to changes and diſeaſes analogous to thoſe of the living body: theſe are conceptions which the ſurgeon attains by ſlow and painful experience, for his teacher aims only at making him know and remember proceſſes, and grooves and holes, which to know, is of no importance, and to remember impoſſible. The practical ſurgeon indeed learns by experience the changes of which thoſe apparently inanimate parts are ſuſceptible; but while he is obſerving how tumors alternately riſe and vaniſh, are produced by diſeaſe or cured by remedies; while he is learning to diſcuſs the tumors, to cure the ulcers, to deſtroy the dead, and to ſupport the living parts of a bone; while he is acquiring by experience all that he ſhould have been taught, all that makes anatomy uſeful, he believes that he is forgetting anatomy, becauſe he is forgetting a gothic and barbarous ſyſtem of names, remembers no longer holes and hollows of no import, and is exchanging the pedantic leſſons of the ſchools for a higher kind of knowledge.

It were better the ſurgeon had no conception of a Hernia, an Aneuriſm, a Hydrocele, than what he obtains from demonſtrations of the Peritonæum, the Abdominal Ring, or the Tunica Vaginalis, or the Humeral Artery; for on the anatomiſt's table he ſees thoſe parts under forms, which, through all his profeſſional career, he is doomed never to recogniſe again, but to look for them in vain, in all his own operations and thoſe of his friends, and that too in the moſt critical exigencies, where they ſhould ſerve as the mark and limit of the inciſions.

The anatomiſt deſcribes for example the ring or opening of the abdominal muſcles, and naturally mentions that it is the opening through which, in Inguinal Hernia, the bowels are protruded; but what avails ſuch a remark? there is no note taken of the various changes produced by this very protruſion, no additional deſcription to connect this anatomy of the ſound, with that of the diſeaſed part; the pupil is not told that he is never to ſee, in the living body, the ſame diſplay of a ring, fair, circular, and circumſcribed ſuch as is exhibited in the diſſection of the ſound body; the ſurgeon feels no ſuch ring in any operation, and doubts, and heſitates, expecting to recognize that circular opening which he thinks he knows ſo well, and has ſo often ſeen.

The anatomiſt, in his courſe of teaching, diſſects the Peritonæum, and deſcribing that membrane, according to the method of Haller, with all its involutions, and all its connections, the coats it forms for the viſcera, and the ligaments by which it binds each in its place, and he concludes with ſaying "this membrane, gentlemen, or a proceſs of it, is protruded through the ring, wherever the bowels are protruded, and forms the herniary ſac." But far different is the ſac which appears to the ſurgeon in the time of operating, thickened by inflammation, rough and irregular, from adheſion, connected, or rather confounded with the ſurrounding parts, imperfectly ſeen through the inciſions, and obſcured with blood, it is altogether unlike the delicate Peritonæum from which it takes its origin, and is no longer to be recogniſed as a proceſs of that membrane! The ſurgeon finds nothing correſponding with the demonſtrations he has ſeen, or the conceptions he has formed: anatomy, which he faithfully ſtudied, that it might be his guide in ſuch difficulties, ſerves only to bewilder and deceive.

The anatomiſt demonſtrates, from his preparations or diſſections, the courſe of the Epigaſtric Artery, compares its ſituation with that of either pillar of the ring, and calculates and conjectures how it may be avoided; he who never operated in hernia, projects rules for the ſurgeon, and inculcates them; and from his lectures ſuch rules are transferred to books, and paſs from age to age, for leſſons as important as they are formal. But when theſe ſame Pillars are no longer to be diſtinguiſhed, the opening betwixt them dilated, and every veſtige of this formal ring obliterated by frequent protruſions; when the deſcending bowels have puſhed aſide this artery, and a new order of parts is exhibited, unknown to the claſs demonſtrator, defying all calculation and conjecture, what muſt be the confuſion of the young unexperienced ſurgeon who foreſees no ſuch changes?

While anatomy is taught, only taught from diſſection of the ſound body! no deſcription, no drawings, no plans, nor ſchemes of the parts ſubjoined to correct the firſt impreſſions, to expreſs the new arrangements of parts which accident produces, to indicate the changes in form and texture produced by diſeaſe! the ſurgeon profits nothing by that ſcience which contains all the principles of his art. In Hernia the cauſe of death is aſcribed to the obſtruction of the bowels, and nothing is deſcribed but the ſigns of ſtrangulation; yet ſtrangulation is not the cauſe of death! The obſtruction of the inteſtinal canal is not the cauſe of death! The actual mortification of the bowel is not the cauſe of death! but that fever and inflammation of the abdomen, which affects the whole ſyſtem, and which is fatal, before the inceſſant vomiting could exhauſt the patient, or the actual gangrene deſtroy him. Yet we have no deſcription of this inflamed ſtate of the abdomen, it is not even noticed, while the ſigns, real and imaginary, of ſtrangulation, are minutely de-

tailed; we have no narrative of the ſymptoms which prognoſticate life or death, and the ſurgeon is hardly aware of his patient's danger, when hiccup, and other fatal ſigns appear.

In caſes of hernia, the various degrees and characteriſtic marks of abdominal inflammation, form the true grounds of our prognoſtics; the anatomy of the parts, in their altered condition, diſtended by frequent protruſion, and maſſed together by inflammation, is the rule of our inciſion; and yet we are referred to the old deſcriptions of the abdominal ring and peritoneal proceſs, for thoſe eſſential points of knowledge which are only to be attained either by frequent and careful obſervation while operating, or by diſſections of diſeaſed parts. Theſe are things which can be deſcribed only by the practical ſurgeon, by the man who has often, with a lively intereſt, obſerved and noted down the perplexing changes which he has met with.

Whence do theſe perplexities ariſe? from the ſeparate and independent ſtate of two departments in ſcience which are eſſentially and cloſely allied. The profeſſed anatomiſt ſits in his chair of dignity, explaining the ſtructure of parts, but with no reference to their condition in diſeaſe: he is no ſurgeon, he has not put his hand to the work, he has felt no difficulties, his hand has not trembled, nor his face blanched at the apprehenſion of danger; he has little intereſt in deſcribing difficulties he has never known, in anticipating anxieties and dangers which belong not to his department; he is employed on higher and more ſplendid, ſhould I not ſay more fantaſtic ſubjects of ſpeculation.—The ſurgeon again, who writes for the inſtruction of others, is often no anatomiſt, and accepts very gratefully, the imperfect rules for operating preſcribed by thoſe who never touched the knife; and thus it happens that

pathology, which ſhould unite ſcience with art, is a ſort of neutral ground betwixt the two provinces of anatomy and ſurgery, little regarded on either hand. The young man, ſtudying our profeſſion, learns his ſurgery and anatomy apart; to reconcile his firſt conceptions of anatomy with the changes which he is called to obſerve in his practice of ſurgery, is a ſpecies of reaſoning which accident ſometimes invites him to cultivate. But acquirements depending thus on opportunity, on accident, on time, which few can ſpare, and on that inceſſant diligence which is ſo apt to flag in the toils of daily practice and needful gain, are often imperfect even in the end of life; and when by continued diligence, a man attains a competent degree of knowledge for the ordinary duties of this profeſſion; the knowledge thus acquired, enters into his experience as an individual, and conſtitutes his reputation, while he lives; it is profitable and honourable to himſelf, and uſeful to his friends; but when he dies, it dies with him, and is not preſerved for the improvement of ſcience.

Pathology is at once the moſt uſeful and the moſt painful ſtudy: there is a ſort of ſatisfaction in finding our conjectures confirmed, our errors corrected, our knowledge continually improved by frequent diſſections; but the frequent diſſection of dead bodies, the act of reaſoning and reflecting on the various cauſes of our diſſolution, the ſight of the dead and the recollection of their laſt ſtruggles and ſufferings, the ſlow lifting up of the cloth, which veils the countenance of a deceaſed friend, caſts a gloom over a mind ſeriouſly engaged in thoſe duties. Yet ſo important is the duty of combining pathology with ſurgery, ſo eſſential is it to the ſound doctrine and diſcipline of ſcience, and to the perfection of our art, that I had rather publiſh to the world deſcriptions of diſeaſed urethra, and

ſwelled proſtate, ſuch as Hunter has delivered and repreſented in drawings, than be author of all the diſcoveries of the age in which he lived: I had rather give deſcriptions and drawings of the herniary ſac, in its various ſtages of inflammation and adheſion, or point out any thing which might facilitate ſo eventful an operation as that for hernia, than diſcover the pereneal myſteries of the thymus or renal gland. I had rather announce a ſeries of ſuch important facts, than ſhew myſelf the moſt ingenious among the dreamers of dreams, for of ſuch materials is produced the knowledge the moſt eſſential to the perfection of our art and the good of our fellow-creatures.

When we reflect on the incorrectneſs of our ſenſes, and the imperfection of memory, we are conſcious that in a ſcience important to mankind, nothing ſhould be left to recollection! every impreſſion of ſenſe ſhould be noted down the moment it is diſtinguiſhed! and from time to time thoſe deſcriptions of evaneſcent impreſſions ſhould be reviſed and compared. We remember, for example, with lively feelings, a ſcene in nature, an intereſting converſation, or the form and manners of a friend, and we think that of ſuch a ſcene or of the terms of the converſation, or of the features and forms which have pleaſed us, we have the moſt lively recollections; but when we attempt to repeat the words, or trace the features with the pencil, when we would aſcertain our conception and put it to the proof, our recollections vaniſh like a ſhadow or a dream! impreſſions, which we believed permanent and luminous, are quite obſcure, and tantalize us with a ſenſe of diſtinctneſs which we cannot realiſe. How dangerous this in matters of ſcience? If it be preſumptuous in a painter to draw a likeneſs from memory, what muſt it be for a ſurgeon to truſt to recollection for thoſe ſigns which are to warn him of approaching

danger, or for thoſe deſcriptions of diſeaſe, thoſe marks of parts, which are to direct him in operating?

Habits of induſtry, which I know not whether to attribute to chance or deſign, have enabled me to compoſe, for my own uſe, the deſcriptions of diſeaſe, and plans of operations which I found wanting in books of ſurgery, and diligence is a talent in ſuch low eſtimation, that it will not be thought preſumptuous, if I claim this kind of praiſe, neither will it be conſtrued into affectation, if I declare that whatever excellence I have attained in my profeſſion, ariſes from mere diligence, from perſeverance in ſtudy, and fidelity in obſervation. In the moſt ordinary duties, faithfully performed, I have ever found the beſt ſources of uſeful knowledge: I never yet attended the pooreſt creature in an hoſpital, without taking an intereſt in his diſtreſſes, and uſually a drawing of his diſeaſe; nor have I neglected, in private practice, to record and treaſure up my opinions of my patient's caſe, my hopes, my ſucceſſes, and my diſappointments, more faithfully than I have recorded my fees. I have never, with unhallowed hand, attempted any dangerous operation unprepared, truſting to my general knowledge of anatomy, or experience in operating; but have ſet me down to conſider ſeriouſly of every danger, to plan the relative ſituations of parts, to provide for every exigence, to recollect the courſe of the great nerves or arteries which were endangered in the diſſection, and to imagine every poſſible alteration in their courſe or form. In every caſe of fractured ſcull, of ſtrangulated hernia, or of inflammation of the abdomen, in every variety of diſeaſes of the lungs, of the throat, or of the glands, I have marked, from hour to hour, the ſymptoms, have made drawings from every diſſection, and have written down, at the moment of witneſſing any intereſting ſcene, the impreſſions

it made upon me, and thoſe characters of diſeaſe, and thoſe ſigns of danger which are ſo evaneſcent. In every Tumor of the neck or jaws, which needed to be diſſected out, I have made new plans of the carotids and the accompanying nerves, marking the branches which were endangered in the operation. In every caſe of Polypus I have drawn accurate plans of its relations to the palate and noſtrils, to the bones or cavities of the noſe or throat. In every Fiſtula I have drawn ſchemes aſcertaining the direction of the various paſſages, their relation to the external openings, to the diſeaſed urethra, and to the ſtricture which cauſed the confuſion of parts; and when I turn over thoſe caſe books, ſo precious to myſelf, I cannot but hope to make them uſeful to others; for with theſe ſilent monitors I conſult, and ſometimes find my conjectures concerning the diſeaſe, belied by experience, or my plans of operations corrected by diſappointments! but always I feel my knowledge of my profeſſion improving, and am conſoled with the reflection of not having ſpent my years in indolence, nor claimed any degree of confidence to which I have not this title at leaſt of diligence and labour.

Many things conſpired to confirm me in this habit of diligence: I felt that an operation to be performed with confidence, muſt be carefully planned; that to loſe the beſt fruits of experience by a ſelf-indulgence, by a lingering and idle humour, was unmanly; to think over every ſubject anew, ſeemed in ſo far as related to myſelf an endleſs toil, and unprofitable to that profeſſion, to which I was publicly pledged, as a teacher and as an author. To think with accuracy, I found it neceſſary to think with my pen, or my pencil in my hand; with theſe I reſolved, to my own ſatisfaction, every ſurgical problem, and ſoon found that my command of facts accumulated, that my general knowledge improved, that my reſources

were expanded, that no caſe occurred without having its precedents to ſerve as a rule for my conduct, without analogous facts to give it importance! and every time I renewed my plans of hernia, aneuriſm, or tumor, I was conſcious of having more diſtinct views and bolder conceptions of my duties as a ſurgeon, and of gaining daily acceſſions of knowledge which, without this faithful practice of ſtudying every caſe, would have been ſtopped in their ſource.

Yet I do not deny that habits, uſeful in themſelves, may have led me into faults very grievous, to even the beſt diſpoſed of my friends; my habit of reaſoning on ſurgical queſtions, not by deſcriptions, but by diagrams, by appealing not in abſtract reaſoning to the imagination, but to the ſenſes, by plans of the parts, may have led me into prolixity, repetitions, and pleonaſms of every kind, and may have increaſed the bulk and price of this volume. But my conſcience dictated to me, that in matters of life and death, accuracy could not be a fault; that in a work of ſcience, ſplendor of execution, not oſtentatious, but plainly uſeful, would not, with the lovers of ſcience, be a ſin unpardonable.

OF THE TALENTS REQUIRED IN AN OPERATOR.

While the ſcience of pathology aſcertains the changes produced by diſeaſe, prepares the young man for practice, and enables him to form a juſt conception, and a true prognoſtic in every caſe of danger; it is the ſtudy of anatomy, and the habit of diſſecting with addreſs, that fits him for operating. I am aware that few ſurgeons are deſtined to become operators, or have ever, from their firſt entering into the profeſſion, felt any thing but horror at the ſight of blood; yet, the talent of operating is deſirable, as it implies a per-

fect knowledge of the ſtructure of the human body, and a ſuperior ſkill in all the ordinary duties of the profeſſion: to acquire this talent (for it may be acquired) is a fair and laudable object of ambition, and carries the young ſurgeon into the moſt uſeful of all ſtudies, that of diſſection: to acquire this talent is not only honourable to himſelf, and ſatisfactory to his friends, but is almoſt eſſential to his own peace of mind: he knows not by what unexpected accidents he may be involved, unawares, in difficulties of this nature, how ſoon he may, through the intereſt of his friends, be charged with the care of a great hoſpital, and find occaſions of laudable ambition opened to his view, and opportunities of being eminently uſeful to numbers of his fellow-creatures! his ſituation, in remote parts of the country, may require him to operate on the poor, and if engaged in foreign ſervice, or in the colonies abroad, he may find himſelf involved in difficulties which will bear hard upon him. But the young ſurgeon who has made this department his ſtudy, is no ſooner engaged in practice, than he becomes conſcious of the ſuperiority it gives him; he is able, with honour, to ſeize whatever opportunities preſent themſelves, of promoting his own intereſt, or ſeeking reputation; and he feels himſelf performing, with alacrity and confidence, thoſe higher duties which often caſt a gloom over the minds of thoſe leſs perfectly educated.

Of all the unhappy feelings which the duties of our profeſſion entail upon us, none are more oppreſſive than thoſe which precede any eventful operation. They naturally ariſe from the reſpect we muſt have for the life and health, the pains and ſufferings of a fellow-creature, who commits himſelf into our hands with entire reſignation. They are avowed by men above all affectation. "If (ſays Cheſſelden) I have any reputation in this way, I have earned

it dearly, for no one can endure more anxiety and ſickneſs before an operation, yet, from the time I begin to operate, all uneaſineſs ceaſes." Cheſſelden though above all competition in this line, a perfect anatomiſt and a bold operator, yet felt and acknowledged theſe compunctious viſitings of nature; but if to thoſe natural fears were joined the ſlighteſt doubt, in the mind of the ſurgeon, whether he could perform his duty, ſhould we wonder to ſee his hand tremble, ſhould we wonder to ſee him preparing for a public operation, with all the feelings of a criminal, and performing it under confuſion, embarraſſment, and viſible concern. It is only a conſciouſneſs of being ignorant of anatomy, and unaccuſtomed with diſſection, a fear or ſuſpicion of ſome unknown and indefined danger, that perturbs the judgment, and unſteadies the hand, and makes a bad operator retire from ſuch a ſcene, if he be at all ſucceſsful, with an exultation of heart which he cannot conceal, and which proves but too plainly that he himſelf imputes his ſucceſs to chance and good fortune.

Nothing ſhould be left to chance where life is concerned; theſe feelings of anxiety ſo natural, ſo honourable to the man who confeſſes them, can be leſſened only by a careful education, and eſpecially by being perfectly familiar with anatomy. He ſurely will feel the moſt perfect compoſure of mind who is prepared for every operation, that is, for every diſſection that may be performed upon the living body, by having frequently diſſected the ſame parts in the dead. The young ſurgeon acquires, by frequent practice, a familiar acquaintance with the ſeveral parts, and a freedom in diſſection, which makes dexterity a natural habit; he learns to compare the ſize, relation, and connection, of the ſeveral glands, nerves, and arteries, and is ſo familiar with the external and viſible forms

which denote their place, that, before operating, he can put his finger on a part and ſay, whether, any danger lies within; he comes inſenſibly to think, without diſmay, of dividing thoſe parts in the living body, which he has often diſſected in the dead; and is able to perform an operation, as he would a diſſection, with the ſame fearleſs and rapid execution, where rapid execution is ſafe.

Moſt unhappily, an opinion has prevailed that the talent of operating is a gift of nature, not to be acquired: that men are born operators: and from this term natural operator, even men of ſenſe and judgment do not revolt. The danger of this opinion requires, that the ſubject ſhould be ſeriouſly conſidered, for it is grievous to think what a relaxation of diſcipline, what a falſe and miſplaced confidence may ariſe from ſuch a prejudice, what daring unprincipled attempts to ſnatch at reputation, by thoſe who imagine themſelves natural operators, and who ſlightly run through ſuperficial education, to ruſh at once into practice.

That a man, to become an operator, ſhould be born with good natural talents, with a quick eye, and a ſteady hand, a mind endowed with firmneſs and courage, is indeed eſſential: But it is not leſs eſſential that he ſhould ſtudy that profeſſion to which he is to apply thoſe natural powers; for of themſelves, unqualified by education and knowledge, theſe natural powers are but the worſe and more dangerous part of the character which the ſurgeon aſſumes, ſince, with the conſciouſneſs of natural addreſs and courage, unſupported by ſkill, he may be induced to attempt operations unprepared, which are to be plainly learnt by diſſection.

There is no ſuch character as that of a natural operator, nor is

there any other profeſſion, learned or unlearned, which makes ſo bold a claim: A muſician, a painter, a poet, become ſo by ſtudy and diligence: excellency, even in the works of genius, is attained only by labour, by the cultivation of the natural powers: If ever there was an inſpired poet, it was Milton, who pours out his prayer "to that eternal ſpirit, that can enrich with all utterance and knowledge, and ſends out his cherubim, with the hallowed fire of his altar, to touch and purify the lips of whom he pleaſes." Yet Milton boaſts not of inſpiration, he prepared himſelf with diligence, meditating during many years, his immortal poem: he ſays, "I hope by labour and intenſe ſtudy, which I take to be my portion in this life, joined with a ſtrong propenſity of nature, I may leave ſomething ſo written to after times as they ſhould not willingly let it die."

Have we ever heard of a natural painter, a natural engraver, a natural muſician? no, ſurely! labour and ſtudy muſt be joined with the ſtrong propenſity of nature. Enthuſiaſm for the beauties of nature, and admiration of the works of art, are the indications of genius; the paſſion for imitation creates only the deſire; it is the handling of the tools of the engraver, the chiſſel, and the pencil, that gives the power of performing; and this power, improved by diligence and ſtudy, improves, in its turn, the genius of the artiſt: his flights of genius are bold and noble, whoſe fervour is not repreſſed by difficulty of execution, but who can give force to the higheſt conceptions of his mind.

Is it then natural to know the human body without diſſecting it? is it natural to operate on the living body without knowing its parts? no, let every young man, who is to ſtudy our profeſſion,

diſſect with unwearied diligence, all the parts and organs of the body, and then only will he be able to know whether he was born an operator.

But I have obſerved thoſe natural operators. One, perſuaded that he is ſuch, confident in his own natural powers, goes unprepared, to do the moſt important operations: he regards even the firſt opportunity of operating as an occaſion of acquiring reputation, and making a public diſplay of his talents: he truſts to chance, and hopes to find himſelf a natural operator; and dreadful muſt that misfortune be, which can perſuade him that he is not, for while chance is allowed to have ſo great a ſhare in his ſucceſſes, it is but too natural for him to impute every misfortune to chance. Natural powers he may perhaps boaſt of, his eye may be as keen, his hand as ſteady, his mind altogether as bold and fearleſs as that of a well-inſtructed man. But it is a boldneſs not qualified by knowledge, and if ever the ſlighteſt doubt comes over his mind, if his operation be perplexed or interrupted by any unexpected event, if once the occaſion for real courage overtakes him, his hand trembles, his head ſwims, he would give the world that he might without ſhame and ruin lay down the knife! this is the cauſe, the ſole cauſe, of that exultation, which bad operators, when they are at all ſucceſsful, cannot conceal.

He who believes himſelf born with theſe natural talents, affects the manner of thoſe who have attained to the reputation of being dextrous operators: his mind is not wrought up to any intenſe feeling of what his patient ſuffers, nor occupied with an intenſe deſire to relieve him from the agonies of the operation: occupied ſolely with the vain and dangerous paſſion for applauſe, he thinks only how he may appear in the eyes of ſpectators. What are the

ſpectators, and what is their applauſe, to the life of a fellow-creature? yet I fear that the cuſtom of making every operation, every neceſſary and unavoidable cruelty of our art, a public ſpectacle for ſtrangers to gaze on, and allowing the claims of thoſe who diſregarding all the aids of ſtudy and experience, boaſt only of their natural talents, has been attended with the worſt of conſequences. Even in private life, operations have been hurried, which might have been deliberately and ſlowly performed: But the hoſpital ſurgeon, like one exhibiting on a public ſtage, loſes no occaſion of charming his aſſemblage of ſpectators, into an opinion of his ſuperior ſkill; hence his operation is all confuſion and hurry, the inciſions are performed with affected dexterity, the purpoſes of the operation are but ill accompliſhed, the arteries are imperfectly ſecured; and, in the end, he huddles up his work, to keep his time and to preſerve the opinion, perhaps to excite the plaudits, of an unjudging mob. This paſſion for applauſe, ſo natural to us, ſo ſubſervient to our intereſts, ſo flattering to our ſelf-love, ſo apt to be excited by the preſence of ſtrangers, who are never to ſee us again, and are to judge of us by one ſingle act of ſkill and courage,—this ſelfiſh and dangerous paſſion, which every ingenuous man muſt confeſs he feels lurking within his own breaſt, cannot be guarded againſt too much! If it is ever to be completely extinguiſhed, it muſt be by a thorough ſtudy of the principles of the ſcience, for a perfect education will carry a man's thoughts beyond this poor ambition.

A man perfectly educated, who is accuſtomed with diſſection, and has fairly cultivated his natural powers, is occupied with higher thoughts. He looks inward for approbation, and cares not for the ignorant applauſe of thoſe who eſtimate his talents, by the rapidity of his ſtrokes! by the movements of a ſtop-watch! He imitates

nothing of the turns and motions of others, every movement of his hand and knife, is his own, and has a meaning, while the whole design of the operation is perfect in his mind. He has no vain nor selfish wish, no feelings, but those of confident expectation and an intense desire to give relief; is absent to all external impressions, and unconscious of any thought which does not relate to his patient's safety. He affects no masterly turns of his knife or hand, no rapidity of execution, no airs of self-approbation to extort applause; but performs his operation in that calm solemn and impressive manner, which persuades his patient most eloquently of his deep regard; his whole deportment shews how conscious he is that he is inflicting cruelties, which, though well designed, may not prove useful; and though planned and conducted with prudence, may endanger life. If he operates with confidence, it is not of that rash and headlong nature, which arises from a vain assumption of natural abilities, of native courage, of address and dexterity inherited from his birth, but such as proceeds from a rational and modest study of that knowledge which is essential to success.

That in taking leave of my reader, I should feel some anxieties, is most natural; but that I should feel an irresistible desire to vindicate those peculiarities in my mode of reasoning or of teaching, which seem to myself the most laudable! to apologize for those plans and drawings which I have found so useful, and for that profusion of illustration which I could not abridge! that I should be inclined to apologize even for the elegance of my book, seems

to myſelf ſurpriſing! Yet on theſe delicate ſubjects I cannot refrain from ſaying a few words.

It may be difficult for my reader to believe, while he ſees before him a long and boundleſs narrative, adorned with ſketches of biography and morſels of criticiſm, relating rather to authors than to operations, that it was my ſincere deſire to concentrate and compreſs ſuch preliminary knowledge into the ſhorteſt bounds, or to teach it in the moſt ſimple form. But clearneſs and ſimplicity were on thoſe ſubjects ſo inconſiſtent with brevity, that I could myſelf arrive at no deciſive and ſimple principle, without reviewing many ſubordinate queſtions, nor ſatisfy my own mind, nor produce truth to others, without a full inveſtigation, hiſtorical and critical: But I had the happineſs to find that every particular criticiſm contained its own leſſon in ſurgical practice. Were the alliance of pathology with ſurgery fairly made out, and become an eſſential part of the education of every ſurgeon, I might then announce, in few words, the deſign and purpoſe of each operation for lithotomy, adding expreſs and definite rules for the manner in which it ſhould be performed. But this ſimple method involves no proceſs of reaſoning, nor of teaching, brings no conviction home to the mind of the reader, does away no prejudices, eſtabliſhes no important truths, nor helps to develope the principles of the ſcience, it is rather the rudiments of the ſcience, and the mere index for a book. My enterpriſe was of a more difficult and complicated nature; but if from a complication of knowledge and variety of illuſtration, I have not deduced ſimplicity of principle, I have certainly failed.

In this firſt part of my ſurgical operations, it is my deſign,—firſt, to lay before my reader a ſketch of the anatomy and pathology of

the parts contained within the pelvis, as the only juſt ground of theory on the diſeaſes of thoſe parts, and the ſole rule of our operation:—ſecondly, to explain the doctrines and deſigns of each lithotomiſt, as the beſt comment on thoſe principles, and as conveying the moſt precious leſſons of ſurgery, in the moſt inſinuating form:—thirdly, to cloſe this general pathology with a view of the various cauſes of obſtruction of urine, the unhappy conſequences to be apprehended from any breach in the urethra, and an account of the leſſer operations required in all the varieties of obſtruction and fiſtula, and finally the operations of introducing the catheter and of tapping the urinary bladder.

Plans and drawings are with me a habitual mode of aſcertaining my own conceptions, and of preſenting them to my reader, and like diagrams in mathematics or mechanics, they form ſo ſure a proceſs of reaſoning, and ſo ſimple a mode of repreſenting and proving every important fact, they are indeed ſo eſſential to the correctneſs of my own views, and to the impreſſing the leſſons upon my reader's mind, that it were better I had not written the hiſtory of various operations, than not have explained the direction of the inciſions, and their probable conſequences, by plans.

While I reviewed the theories of the older lithotomiſts, and compared their operations with each other and with thoſe of modern times, I found the peculiar character of the individual ſtill mixing itſelf with his projects, and could form no ſure concluſion on the merits of his deſign, without eſtimating his prejudices, his doctrines, his opportunities of attaining knowledge, the ſchool in which his talents were ripened, and the theories of the age in which he lived; till I had gone through this long proceſs, I not only could not pronounce truly on the advantages of his operation! but could

not be aſſured of the facts! rarely do we find a man ſo ſincere in the love of ſcience, ſo ingenuous and faithful in relating his experiments, ſo impartial in his own cauſe, as to expoſe fairly the ill ſucceſſes of a favourite operation: ſo what he wiſhes to prove, he thinks he proves; what he is inclined to reject, he finds out reaſons for rejecting.

If drawings and plans be thus eſſential, I need not fear to compare thoſe of my preſent volume, with the groteſque repreſentations which we find in various books, not of pieces of anatomy, or plans of operations, but of obſolete inſtruments! groups of patients and ſurgeons! drawings, which have deſcended through many generations, from Tollet, Garengeot, Heiſter, in uninterrupted ſucceſſion. We are preſented with pictures, ill drawn at the firſt and worſe copied in every ſucceeding book, of patients placed in the poſture for lithotomy (who does not know the poſture for lithotomy?) with aſſiſtants, piled one above another, according to the true principle of the pyramid! But they are much fitter to ſerve as benefit-tickets for Sadler's Wells, with groups of tumblers, and ſtrong men, performing their feats, than as the ſerious and important drawings of a book of ſurgery.

In books ſtill more modern, we find a wonderful œconomy, both in reſpect of invention and execution, for the drawings are only ſketches of knives, and gorgets, and ſtaffs, and theſe are copied from each other through time immemorial. The celebrated Mr. Sharp condemned the multitude of inſtruments as a diſgrace to ſurgery, and Mr. Pott declared that almoſt every thing might be done with a ſimple ſcalpel. I have ſeen, in avowed contradiction to theſe great practical ſurgeons, a profeſſor's table encumbered with inſtruments of all ages; and in the books of ſurgery we find, at

every turning of a leaf, a picture of a crooked knife. Such embellishments remind me of a little book of the history of Scotland, which I delighted much to read in my younger days; the carver of wooden plates, who had been employed to decorate the work, having a just conception of the ferocious feudal times, to which the said history related, and having moreover a due sense of œconomy, engraved two cuts, the one was that of a bloody battle, with spears, and axes, and bows, the other was that of a traitor drawn limb from limb, by wild horses; and the two plates succeeding each other, alternately, adorned very handsomely, the whole volume, and like pictures of knives, in a book of surgery, were seldom out of place.

If we but consider the numbers of excellent engravers, two thousand perhaps in the city of London alone, administering to a vicious and pampered taste, embellishing new editions of historians and poets, with superfluous drawings and vignettes, or decorating our chambers with prints, fashionable to-day, and cast aside to-morrow, it will not seem unreasonable, that one engraver should be employed, for one year, in contributing to the advancement of a science in which all men have an interest. Anatomical drawings may, in some degree, supply the place of dissections, assist in connecting the two departments of surgery and anatomy, represent with more particular accuracy, those pieces of anatomy which, though useful in our profession, are neglected in a general course of demonstrations, and remind the surgeon engaged in actual practice, of things too apt to be forgotten, and yet most essential to his success; and therefore, though aware of what may be said, I am nothing doubtful of the propriety of what I have done. Drawings of anatomy and plans deduced from these draw-

ings, being always acceſſible to any ſurgeon, may eventually ſuggeſt the moſt important meaſures in the moſt deſperate caſes, and enable an ingenious man to form intereſting conjectures concerning the cauſes of diſeaſe or the means of relief, and qualify him for interpoſing in caſes of extreme danger and alarm. In all varieties of ſituation, abroad or at home, in country or in town, ſketches of ſurgical anatomy will be uſeful to the profeſſion, by reviving the recollection of paſt ſtudies, and will enable the ſurgeon to prepare himſelf for his operation, not by reading imperfect deſcriptions, but faithful repreſentations of the parts.

LITHO-

LITHOTOMY.

SECTION I.

ANATOMY OF THE GENITAL PARTS AND OF THE VISCERA OF THE PELVIS.

It is the great and peculiar excellency of our profeſſion that all its facts are ſenſible and demonſtrative; that its problems admit of direct and plain ſolutions; that the axioms and principles of the ſcience are to be found in the ſtudy of anatomy. In ſurgery we ſeek for no other authority than the anatomy of the human body; we need not go to the writings of Greek or Roman authors to learn how the parts may be moſt ſafely divided in the operation of the Stone. To the ancients, unacquainted as they were with anatomy, we deny all ſuch pre-eminence, and decide on the faults or excellencies of their operations according to the immutable principles of the ſcience; for their operations, though invented and performed without any reference to principles, muſt yet abide this teſt. It is not then with the deſign of learning the principles of our profeſſion that we review the projects, criticiſe the operations, and enquire into the ſucceſſes of the older ſurgeons; but with the ſole view of making ourſelves more familiar with the anatomy of the parts of generation, for every time we reflect on any particular operation we learn to conſider the parts and their relations to each other in ſome point of view not till then thought of, and while we reflect on the advantages or dangers of the various forms of inciſion we improve in knowledge; we learn to reaſon more correctly; we learn to compare the parts with each other in every poſſible form and poſture; and it is by thus acquiring a correct and perfect knowledge of the parts, and a lively recollection of their forms, poſtures, and bearings, that (after examining all other modes of inciſion), we are enabled to perform our own favourite or accuſtomed operation with

ſteadineſs and ſkill. Such are the advantages of anatomical principles and of critical and hiſtorical knowledge which mutually aſſiſt each other and improve at once the head and hand of the ſurgeon.

I am now to explain an operation, which, more than any other, requires a perfect knowledge of anatomy; for however properly trepan or amputation may be performed by thoſe unaccuſtomed to diſſection; lithotomy and hernia and aneuriſm, the extirpation of tumors, and all the delicate operations in ſurgery, can be performed by thoſe only who are thoroughly acquainted with the anatomy of the parts.

In a book of ſurgery, good drawings are a fair ſubſtitute for actual diſſection; and anatomy, in ſo far as it is ſubſervient to ſurgery, muſt in an elementary book of ſurgery be taught anew. A piece of ſurgical anatomy, i. e. the accurate methodical diſſection of the parts divided in any particular operation, differs widely from any ſlight view that may be given in the general demonſtrations of the anatomy of the human body: after general anatomy has been taught, ſurgical anatomy ſtill remains to be explained and applied.

Drawings then are the repreſentations of this anatomy, and involve in their explanation the chief practical leſſons in ſurgery. Drawings enable us to diſtinguiſh the parts moſt important for the ſurgeon to obſerve; and as they enable us even more than an actual diſſection, to mark diſtinctly the proportions and relations of parts to each other, they are effectually the proofs of what may be ſafely attempted, and the diagrams by which every difficult queſtion in ſurgery may be finally reſolved. No ſurgeon can at once engage in actual diſſections and in the toils of practice, drawings muſt therefore ſerve to the practical ſurgeon as memorials and records of knowledge formerly attained, while the rules for operations muſt be founded on an accurate repreſentation of the parts. Drawings of ſurgical anatomy ſhould be made only by the ſurgeon himſelf; for he repreſents the proportions, poſtures, and relations of parts to each other with a degree of accuracy to which the mere artiſt never can attain, and with views and intentions which the mere artiſt can neither conceive nor execute. To place a diſſection of certain parts before an artiſt, and explain their uſes and connections, is only to perplex him with matters which he can never comprehend; to require him firſt to draw thoſe parts of which he has no correct ideas, and then to invent from his drawings, plans and diagrams explaining the rules of practice, would be not merely abſurd in itſelf but highly dangerous to the profeſſion; and yet plans and diagrams invented

after correct and careful drawings, are the only means of teaching what the ſurgeon actually performs, while with his knife he diſſects deep among the parts, where the ſpectators no longer ſee the forms of his inciſions; where he himſelf is no longer guided by the eye, but directed by feeling with his finger, and by his perfect knowledge of anatomy.

I proceed then to initiate my reader in that line of ſtudy which I have myſelf found uſeful. The deſign of this particular ſection is to enable the young ſurgeon to renew and to perfect his ſtudies, by diſſecting the parts of Generation as in the actual operation of cutting for the ſtone; to revive in the minds of thoſe who are already employed in practice, the recollection of a piece of anatomy ſo intereſting in every point of view, and yet ſo eaſily forgotten; I hope that even thoſe who have long practiſed the profeſſion will find ſomething uſeful in the obſervations which I ſhall take occaſion to make in explaining the anatomy of the parts; and I am inclined to believe that the practical ſurgeon will from reading deſcriptions, acquire greater facility in introducing the catheter, in feeling and diſtinguiſhing from the rectum (or through the inciſions for Lithotomy) the ſeveral points of the urethra, bladder, and proſtate gland, and will be able to puncture the bladder with more confidence, and to cut for the ſtone with deciſion and ſkill.

With this explanation of the drawings I chooſe to begin, becauſe this enables me firſt, to demonſtrate the anatomy, mutual relation and intimate ſtructure of the ſeveral parts; and ſecondly, from that demonſtration, to deduce plans and illuſtrations applicable to all the various operations; and to theſe drawings I ſhall hereafter appeal for the truth of every theoretical concluſion, and the correctneſs of every rule of practice.

The general plan of theſe illuſtrations is as follows: the four firſt drawings explain the whole anatomy of the parts lodged within the pelvis; the fifth and ſixth drawings explain the muſcles and other parts which cloſe the opening of the pelvis; the ſeventh and eighth drawings repreſent the two ſucceſſive inciſions of Lithotomy; firſt, that through the membranous part of the urethra made by the knife; and ſecondly, that through the proſtate gland made by the gorget; while the ninth drawing explains ſome very eſſential and important circumſtances, as obſerved in the body of a man who had been unſucceſsfully cut for the ſtone, and the ſtone left in his bladder, ſo as to occaſion his death.

THE FIRST DRAWING

Is designed to ſhew the parts as torn from the pelvis, with all that looſe cellular ſubſtance by which they are connected; becauſe it is of the firſt importance to obtain correct ideas of the bending of the urethra, the place of the proſtate gland and veſiculæ, and the mutual connections of the rectum and bladder. In this drawing the parts are preſerved very nearly in their natural relation to each other, and they are drawn almoſt of their natural ſize.

THE SECOND DRAWING.

Is deſigned to ſhow the penis, urethra, proſtate gland, veſiculæ, diſſected, clean, and laid out in a direct and ſimple poſture; becauſe it is of importance that ſurgeons ſhould know the preciſe form, ſize, and proportion of the ſeveral parts unembarraſſed with any connection with the ſurrounding viſcera, and cleared of cellular ſubſtance. In this drawing, the urethra, the membranous or naked part of that canal, the proſtate gland, the veſciculæ, and the muſcular fibres of the bladder, are all diſtinctly ſeen.

THE THIRD DRAWING

Is deſigned to ſhew the parts once more, in their natural and undiſſected condition within the pelvis, and connected with their cellular ſubſtance; the *levator ani muſcle* which covers equally the bladder and the rectum, and in a manner lines the pelvis, is alſo fully diſplayed, becauſe this moſt important muſcle is little known: in reſpect of ſize, of fleſhineſs, of fibre, it greatly exceeds what is uſually imagined from deſcription: and its action creates great ſympathy among the parts, and explains the ſymptoms of various diſeaſes: it is neceſſarily divided in every operation on thoſe parts; and moſt unfortunately, the ſlighteſt error in the diſſection of this muſcle prevents the eaſy introduction of the gorget. To the imperfect knowledge and incorrect diſſection of the levator muſcle muſt we impute the horrible accident of the gorget miſſing the bladder, and being driven among the adjacent parts.

THE FOURTH DRAWING.

Preſents to view the levator muſcle thrown down; the membranous part of the urethra, the proſtate gland, and the veſiculæ, which all lie under it; diſſected and

Anatomy of the Parts.
First Sketch.

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displayed, for the dissection of this muscle is an essential step in the demonstration of those parts; the relation of the levator ani to the rectum, bladder, and perinæum, are important in every sense, and without this step of the demonstration being carefully explained; the surgeon could not understand, how deep the prostate lies, through how thick and fleshy a part he has to dissect after having cut through the skin and fat, before he arrive at the prostate; nor could he be sensible without this demonstration, of the importance of dissecting this muscle fairly, nor imagine the confusion that must ensue when the fibres of this muscle being imperfectly dissected, close again so as to cover the incision or slit made in the urethra, and prevent the introduction of the beak of the gorget into the groove of the staff.

THE FIFTH DRAWING

Completes the demonstration of the anatomy of the parts; for it shews how the pelvis is closed from without, by powerful muscles; how the accelerator urinæ covers the bulb of the urethra; how the transversalis perinæi crosses the perinæum and assists in retracting the rectum when protracted; how the sphincter ani closes the opening of the gut; and how all these muscles, by their close union with the levator, become as it were parts of one great muscle, closing the outlet of the pelvis, resisting the protrusion of the rectum, supporting the viscera, and serving as a sort of antagonist muscle to the diaphragm, by which the viscera are pressed downwards in every act of respiration *.

EXPLANATION OF PLATE FIRST.

The whole pelvis is occupied by the bladder and rectum, which may with propriety be named the viscera of the pelvis; and in the first drawing, on which my reader is now to keep his eye, these parts are represented in the following circumstances: they are rudely torn out from the pelvis as in an ordinary dissection surrounded by all their fat and cellular substance, yet separated so far as to show their general forms, while all their more important connections are left entire. But the

* In this general enunciation of my scheme, I explain only the anatomy of the parts as demonstrated in the four first drawings, reserving the explanation of those drawings which mark the forms of the several incisions in the operation of lithotomy, for another section,

rectum, bladder, and proſtate gland, though their natural connections are in ſome degree preſerved, are not preciſely in their natural poſture; the bladder is drawn away from the rectum, on which it naturally lies, ſo as to ſhow the looſe cellular ſubſtance by which the rectum and bladder are joined; the bladder is turned over to one ſide, that the lower ſurface of it being expoſed, the veſiculæ ſeminales and proſtate gland may be the more diſtinctly ſeen. The penis is ſuſpended by a ſtring, and another ſmaller ligature draws the urinary bladder aſide, and gives tenſion to the edge of the peritonæum.

1ſt. The rectum and bladder ſo entirely occupy the pelvis, that all the lower part of the bladder, and the whole of the rectum, is embedded in fat and connected with the ſurrounding bones by a looſe cellular ſubſtance; all the upper part of the bladder is covered with the ſmooth and firm membrane of the peritonæum; the peritonæum is here ſeen paſſing from the rectum over the fundus of the bladder, and the cut edge marked (1) is held up by a ſtring to ſhow the looſe cellular ſubſtance which connects the bladder and rectum within the pelvis. The edge of the peritonæum (1 2) marks the natural diviſion betwixt the abdomen and the pelvis; the bladder and rectum are thus excluded from the general cavity of the abdomen; and in conſequence of this natural diviſion the operation of lithotomy is leſs dangerous for the interpoſition of this membrane while it divides the pelvis from the abdomen limits the inflammation cauſed by lithotomy to the cavity of the pelvis *alone*.

In caſes of difficult delivery with forceps or the crotchet in women, or after the operation of lithotomy in men, we ſometimes find the inflammation extending to the peritonæum, and then the abdomen ſuppurates. The peritonæum continues, in caſes of puerpural inflammation, to pour out an immenſe quantity of thin ſerum, like the ſynovia of a diſeaſed joint, mixed with pus. This matter flows in ſuch profuſion, that I remember ſeveral caſes in which it ſoaked through beds and mattreſſes and ran down upon the floor; the woman dying with a puerperal fever generally on the ſixth or ſeventh day. But after the operation of lithotomy I do not remember that the belly has ever ſuppurated, except in one boy of ten years old, in whom the abſceſs was opened at the navel and the boy ſurvived.

The inflammation which ſucceeds lithotomy is limited to the pelvis; the matter forms among the looſe cellular ſubſtance lying betwixt the rectum and bladder, where the urine alſo ſpreading, ſometimes produces gangrene, or making its way among the parts produces fiſtulas; this looſe cellular ſubſtance is marked (3 3 3); and it is here worth remarking that when Raw, in imitation of Frere Jaques, and

Cheſſelden, in imitation of Raw, opened the bladder, not by dividing the proſtate gland, but by cutting behind it, the part of the bladder that was ſtruck, was the ſpace marked (4), betwixt the veſiculæ ſeminales, viz. theſe lithotomiſts ſtruck their knives into the flat part of the bladder which lies upon the rectum; and thence the ſwelling of the bruiſed proſtate gland hindering the egreſs of the urine by the natural paſſage, and the looſe cellular ſubſtance receiving the extravaſated urine, ſuch irregular ſuppurations were formed, that Cheſſelden (who, when he had contrived for himſelf a better operation, loſt but one patient out of twenty-eight) loſt actually four patients out of ten by this deep inciſion.

There is another circumſtance reſpecting the line of the peritonæum which deſerves notice. The peritonæum as it paſſes off from the forepart of the rectum riſes over the bladder: where it paſſes from the one to the other it makes a ſort of ſacculus in the direction (5) at the ſides of the pelvis; the folds of this membrane have ſomewhat of the form of ligaments, and indeed theſe are juſt the edges and foldings that being in women reflected from the ſides of the uterus, are called the ligaments of the womb, though they do in no ſhape regulate the poſtures nor motions of the womb. The peritonæum, when it riſes over the fundus of the bladder, adheres to it very firmly, and is very hard, conſtituting the external coat of the bladder; but where the peritonæum thus covers the bladder, the bladder is not ſo dilatable as in its lower part, therefore the peritonæum only caps the bladder as it were; it covers only one third or leſs, the reſt of the bladder, which is the dilatable part of it, lies embedded in the cellular ſubſtance of the pelvis. Now it is from this circumſtance of the peritonæum reaching down but a very little way towards the pubis, and from all the dilatable part of the bladder being below, that the bladder, in its diſtended ſtate, carries the peritonæum before it, ſo as to preſent a ſurface above the pelvis, where it is poſſible, without wounding the peritonæum, to cut into its body. This is called the high operation for lithotomy. The inciſion is made above the ſymphyſis pubis, the bladder being previouſly diſtended to its utmoſt by injections; the loweſt line of the peritonæum is marked (6); the part of the bladder which lies againſt the inner ſurface of the pelvis is marked (7); the ſpace which may be opened without wounding the peritonæum is marked (8).

OF THE RECTUM.

We ſhall now deſcribe this view of the rectum more particularly, and as my reader runs his eye downwards along the inteſtine, the ſeveral figures will denote the following circumſtances of its ſtructure and connexions; (9) marks that part of the rectum which lies above the peritonæum within the cavity of the abdomen, or rather what is ſeen here is the ſygmoid flexure of the colon, where that inteſtine terminates in the rectum or ſtraight gut; for the rectum or ſtraight part of the gut lies chiefly below the peritonæum. This ſygmoid flexure is marked chiefly by the ſmoothneſs of its ſurface, by the quantity of fat that appears ſhining through the peritonæal coat, and by the pendulous maſſes of fat (10 10) which hang from the ſides of the gut, and reſembling the fat of the omentum, are named Appendices Epiploicæ. This cut part of the inteſtine is tied, becauſe the lower part or rectum is ſlightly inflated to keep it in a natural poſture with regard to the bladder.

Figure (6) marks the line of the peritonæum dividing the pelvis from the abdomen; (9) that part of the rectum or of the colon rather, which lies within the proper cavity of the abdomen, unconnected with any other part, floating in that cavity like the other inteſtines, and covered with the ſmooth and lubricous membrane of the peritonæum. All below the line of the peritonæum is within the proper cavity of the pelvis, where the rectum lying in the hollow of the ſacrum is connected by cellular ſubſtance with that bone, and ſurrounded even in the leaneſt ſubject with maſſes of fat. (11) marks that maſs of fat by which it is connected with the upper part of the ſacrum; (12) marks thoſe pellotons or bundles of fat which run all along the poſterior parts of the inteſtine; (13) marks that particular quantity of fat which ſurrounds the cavity, and in which the ſphincter ani is involved, and which filling the outlet of the pelvis, occupies in an eſpecial manner the great hollow which is under the Tubur Iſchii, betwixt it and the anus; and as it is in this hollow that the inciſion for lithotomy is made, this is the maſs of fat which we have to cut through, often to the depth of three inches, in performing the operation upon a luſty man. (14) marks thoſe bundles of fat and cellular ſubſtance by which the rectum is connected with the upper and back parts of the bladder, and in ſhort the quantity of fat ſeen in this view is ſuch, that we cannot wonder at the frequence of fiſtula or abſceſs among cellular ſubſtance ſo very looſe, nor at the ill ſucceſs of thoſe operations in which the lithotomiſt cut deep into this hollow. (15) marks the tranſverſe muſcular fibres of the rectum; and (16) marks longitudinal muſcular fibres very ſtrong,

running longitudinally along the gut in three or four broad bands, and which, from their perpendicular direction, and the peculiar form they give this part of the gut within, are named the pillars of the rectum; (17) marks the ſphincter ani, a broad and fleſh muſcle ſurrounding the margin of the gut, of which but a ſmall part is ſeen in this drawing.

OF THE BLADDER, VESICULA, PROSTATE GLAND, AND URETHRA.

The ſhape of the urinary bladder in man is very peculiar; in the lower animals the fundus or bottom is the larger part, while the bladder becomes gradually ſmall towards the neck; but in man the fundus is ſmall and conical, while the lower part is broad and flat. The rectum is received as it were into a broad hollow betwixt the two bulgings of this broader part of the bladder; the two bulgings of the ſide of the bladder are very big and ſaccular, reſembling two bags on each ſide of the rectum; under theſe bulgings, i. e. betwixt them and the forepart of the rectum, lie the two veſiculæ ſeminales; and the ends of the veſiculæ project at the two ſides from betwixt the bladder and rectum, while the points of the veſiculæ converge and meet nearer the proſtate gland. The triangular ſpace betwixt the veſiculæ is a hollow impreſſed as it were on the lower ſurface of the bladder by the bulging ſhape of the rectum; this is the ſpace into which the trochar is ſtruck when we perforate the bladder from the rectum, it is alſo the part which was aimed at by the old lithotomiſts.

In this view the bladder is ſomewhat raiſed from its natural poſition and laid over to one ſide; (4) marks the hollow which receives the convexity of the rectum; (18) marks the lateral bulging of the bladder on which the veſiculæ ſeminales marked (19) lie; (20) marks the veſicula ſeminalis of the left ſide; and (21) marks the meeting of the two veſiculæ, their ducts running in together under the head of the proſtate gland. This lower or back part of the bladder then is not covered by any bulky parts, it lies upon the forepart of the rectum, and when the bladder is diſtended, the fluctuation of the urine may be eaſily felt here, by introducing the finger into the anus, and at this point the bladder may be tapped by introducing a long trochar, guided by the finger; but it is particularly to be obſerved that it is only in obſtructions from diſeaſe in the urethra, that the bladder may be tapped; for in the more frequent obſtruction ariſing from a ſwelling in the proſtate gland, the increaſed ſize of the proſtate removes the body of the bladder farther back, inſtead of this thin and membranous part of the bladder

the bulky ſwelling of the gland preſents itſelf; and the ſurgeon who does not diſtinguiſh accurately with the finger, who does not underſtand both the natural form of thoſe parts, and the effect of diſeaſe, inſtead of ſtriking his trochar into the bladder itſelf, will drive it deep into the ſubſtance of the proſtate gland; he will draw off no urine, the operation will rather confirm the obſtruction, and ſuch a wound, added to the preſent ſuffering of the patient, may bring on mortification and death! I ſpeak only of what I have ſeen, I am ſorry to ſay, more than once. This is what the ſurgeon might conclude a priori if he would condeſcend to ſtudy the proportions of the parts in health and in diſeaſe, for a ſwelled proſtate actually occupies the outlet of the pelvis ſo entirely as to give a flattened form to the fæces as they paſs.

But though no bulky parts are interpoſed betwixt the rectum and bladder, the ſides of the bladder and of the rectum are connected with each other by being both involved in one thick and maſſy muſcle named the Levator Ani. This muſcle is not diſtinctly ſeen in the preſent drawing, it is of neceſſity diſſected off to ſhow the hollow betwixt the bladder and rectum where the veſiculæ lie, but though diſſected it has not been entirely cut away. The maſs marked (22), which is turned back ſo as to diſplay the veſiculæ, conſiſts of a part of the LEVATOR ANI muſcle involved in fat; it is held aſide by a ſtring; it is ſeen connected by cellular ſubſtance with the ſides of the bladder, and the lifting up of this maſs, beſides ſhowing the cellular interſtice betwixt the bladder and rectum, and the veſiculæ, ſhows alſo the URETER (23) embedded in fat and entering the bladder a little above the veſiculæ ſeminales, in a manner which will be more diſtinctly repreſented in my third drawing.

The oppoſite ſide of the bladder which lies under the pubis is ſtill ſurrounded by the ſame looſe cellular ſubſtance, and by the ſame maſſes of fat. The ſpace marked (7) lies under the pubis; the veins marked (24) belong not merely to the coats of the bladder, but ſeem to convey away the blood from the penis, and there is a vaſt plexus of veins lying betwixt the forepart of the proſtate gland and the inner ſurface of the pelvis, of little importance indeed, in conſidering the operations which may need to be performed on thoſe parts, but particularly worthy of notice in conſidering the ſtructure of them. The cellular ſubſtance here is looſe, a circumſtance eſſential to the free motion of the bladder; the interpoſition of ſuch quantities of fat betwixt the bladder and rectum, and indeed every where within the pelvis is but an accident proceeding from the looſeneſs of the cellular

ſubſtance. The fat under the peritoneum where the bladder lies againſt the pubis is here repreſented in large maſſes; the difficulty of diſtending the bladder ſo as to raiſe the peritoneum to a due diſtance above the pubis and to enlarge the ſpace (8) ſo as to admit the high operation, was much complained of by Douglaſs, and occaſioned the death of many of his patients; for in ſeveral the peritoneum was cut, and the bowels fell down among the operator's hands; and even when this ſpace was large enough to admit a free inciſion, the looſeneſs of the cellular ſubſtance here, as at the lower part of the bladder, occaſioned ſuch depoſitions of urine and matter among the cellular ſubſtance, and under the muſcles, as often occaſioned death.

The veſicula ſeminalis of each ſide, lies flat betwixt the rectum and bladder; the ureters and the ſeminal ducts run towards the neck of the bladder nearly in one direction, but they come from very oppoſite points and therefore in this diſſection they are neceſſarily ſeparated from each other; the ureter (23) is drawn away from its natural direction and raiſed up together with the fat, and the portion of the levator ani under which it lies. The vas deferens or ſeminal duct (25) by which the ſemen is conveyed from the teſticle to the veſicula ſeminalis, turns from the teſticle over the forepart of the os pubis, enters the ring of the abdominal muſcles, paſſes along the ſide of the bladder, runs down the back of the bladder, and going along betwixt the lower part of the bladder and the fore part of the rectum, terminates in the veſicula ſeminalis. This long courſe of the vas deferens among the cellular ſubſtance on the ſide of the bladder is diſtinctly ſeen in this drawing; but the naked forms of the ureter and ſeminal duct, and the manner in which they croſs each other, are better ſeen in the ſecond drawing; in the third plate the direction in which the ureter enters the bladder, and in which the vas deferens joins the veſcicula are very well diſplayed.

From the bladder which we have deſcribed in all its circumference, we return to deſcribe the PROSTATE GLAND, URETHRA, AND PENIS. The ſpace marked (4) is the naked and flat part of the bladder which lies upon the rectum; the veſicula ſeminalis of the right ſide is marked (19); that of the left ſide is marked (20); the meeting of the two veſiculæ under the proſtate gland is marked (21); and here the ſeminal ducts running under the ſubſtance of the gland penetrate the neck of the bladder preciſely at the commencement of the urethra, where they lie cloſe together; their entrance makes a long ſhaped bulging, and the openings of the ducts give that bulging ſome ſlight reſemblance to the head of a wood-cock, and

the part is thence named Caput Gallinaginis. The proſtate gland is marked (26); the older anatomiſts always ſpeak of this part in the plural number, they conſider the gland as double, many who preſumed to deſcribe the proſtatæ took their ideas of the gland on report, without ever having ſeen it. The proſtate gland is a large firm and ſolid maſs ſurrounding rather the neck of the bladder than the beginning of the urethra; it is ſo far double that it has two remarkable bulgings on each ſide, which yet form but one maſs; the intermediate part which lies directly under the bladder and upon the rectum, though flat is exceedingly thick. The gland is altogether of a conical form or like the ace of hearts on playing cards; it is bigger than the largeſt cheſnut and nearly of the ſame ſhape; it entirely ſurrounds the neck of the bladder, though the chief maſs of the gland lies below the beginning of the urethra and very little of it lies above. This gland, inſtead of being formed in two lobes (as one would ſuppoſe from the old deſcriptions) with regular ducts leading from each lobe, is one complete gland with numerous ducts, ſeven or eight of which are ſeen diſtinctly on each ſide of the caput gallinaginis, opening with mouths ſo open and large that we can eaſily introduce briſtles into twelve or fourteen of them.

The proſtate even in its natural unenlarged ſtate, is eaſily felt from the rectum by introducing two fingers into the gut; it is firm and hard and in its texture a good deal reſembles a diſeaſed ſcrophulous gland; it lies ſo upon the neck of the bladder and preſents itſelf ſo directly within the external inciſion of lithotomy, that to make the inciſion of the bladder behind the gland in the ſpace marked (4) has been always found difficult; to dilate the gland and force it open with inſtruments after cutting the urethra is almoſt impoſſible, and never to be accompliſhed without dreadful laceration; the manner of dividing or of dilating this gland therefore has been the chief queſtion in lithotomy.

From the point of the gland the urethra emerges naked and membranous; this membranous part of the urethra is, a ſpace marked (27), about an inch in length; it is naked becauſe the proſtate has ceaſed to ſurround it, and the bulb or cellular part of the urethra has not begun to cover it; it is called membranous from its thinneſs, yet is not entirely without ſupport, for this delicate part of the urethra is tied firmly to the arch of the pubis by a ligament, a ſtrong triangular ligament which fills the lower part of the arch of the pelvis, and allows the membranous part of the urethra to paſs through an opening in it. In conſequence of this paſſage through the ligament the direction of the urethra is ſomewhat altered, the catheter

when it ſtops, is always interrupted juſt at this turn which is cloſe under the pubis; it was at this point that on account of the difficulty of paſſing it, the old ſurgeons made what they called their cunning turn or "*tour de maitre.*" I mark this difficulty becauſe it muſt never be out of the ſurgeon's mind when introducing the catheter, that particular addreſs is neceſſary at paſſing this point, and that as the catheter is then preſſing againſt the naked and membranous part of the urethra, it is apt to tear it and make a falſe paſſage.

But it muſt be remarked that in this drawing the membranous part of the urethra is not ſeen in its true direction, for the bladder being pulled away from the rectum has diſtended the urethra; the true drawing of any part repreſents the actual forms of the parts and their proportions, and the manner of their connexion by cellular ſubſtance; but the ſtrict relation of the ſeveral parts to each other as it exiſts not in the diſſected but in the entire and living body, can only be repreſented by plans; it ſeems a ſoleciſm, yet it is true that plans or *imaginary* drawings are neceſſary to correct the true drawings of the parts.

The part next in order is the bulb of the urethra marked (28); it is a cellular ſubſtance ſurrounding the lower part of the urethra, of which the following circumſtances are worthy of notice: firſt, this cellulated ſubſtance is formed diſtinct from the urethra, and altogether independent of it; it ariſes from no bone or ligament, is ſurrounded with its own firm coat which gives it its form, and contains that blood which is always circulating in it; the bulb of the urethra is formed an inch or more below the place where it begins actually to ſurround the canal; and this part upon which the figure (28) is placed, has no connexion with the urethra; is independent of it; and is named the pendulous part of the bulb. Secondly, From this point (29), when the pendulous part of the bulb is actually connected with the urethra, the urethra and the ſpongy or cellular ſubſtance of the bulb become as one; this cellular ſubſtance is called therefore the Corpus Spongioſum ipſius Urethræ and this corpus ſpongioſum or cavernoſum, ſo cloſely ſurrounds all parts of the urethra, that the ſlighteſt breach of the inner membrane is immediately followed by a diſcharge of blood. Thirdly, It is to be remarked that the blood which is found in the corpus ſpongioſum is not, as is uſually imagined, injected occaſionally into the cells by the action of the arteries, or occaſionally accumulated by the compreſſion of the veins, it is perpetually circulating there, the cells are continually full of blood, which is as it were ſecreted in this cellular ſubſtance by the arteries of the penis, and the penis is diſtended to erection by an occaſional excitement of

thoſe arteries, pouring out this blood in more than uſual quantities. The cellular bodies of the penis then are like veins ſometimes particularly dilated, but always full of blood; the bulb of the urethra is alſo thinner in its coat than the reſt of the penis, and has a very free communication with the pudic veins; it is itſelf properly a dilated vein; it occupies the whole length of the perinæum, and is of ſuch delicacy that while the ſlighteſt injury of the inner membrane cauſes hæmorrhage from within the canal of the urethra, a blow on the perinæum burſts it; then its blood being extravaſated into the common cellular ſubſtance, ſpreads ſo that all the ſkin over the perinæum and down the thighs, and along the groin, becomes black with extravaſated blood; the blood continues to exude into the cellular ſubſtance under the ſkin; blood is alſo diſcharged at firſt in a full ſtream and afterwards in great clots from the urethra; the parts are ſo crammed with the extravaſated blood, that the canal of the urethra is compreſſed by it; the urine is obſtructed, and the following accidents happen! The patient the firſt time he attempts to paſs urine, has the ſenſation of diſcharging it, and yet none runs out by the yard; he continues preſſing, and the urine ſpreads from the breach in the urethra among the ſurrounding cellular ſubſtance; the gangrene which at firſt was apparent only from the extravaſation of blood, becomes real from the extravaſation of the urine, which is ſo hurtful to the cellular ſubſtance that it never can reſiſt it; ſloughing of all the ſkin of the perinæum and ſcrotum enſues, and ſometimes incurable fiſtula. Such are the frequent conſequences of the burſting of the bulb from a kick or blow upon the perinæum.

The ſlip of fibres which traverſes the membranous part of the urethra and which is held aſide in this drawing by a thread marked (29), is not as it ſeems a muſcle, nor any parcel of muſcular fibres; it is a cord of veſſels ſurrounded with a fibrous cellular ſubſtance, the arteries in this bundle of cellular ſubſtance are thoſe which go to the root of the penis, and enter into the cavernous bodies of the penis and of the bulb; theſe are the arteries which fill and diſtend the cells, and the cordon of fatty fibres and arteries is held aſide to ſhow the manner in which the membranous part of the urethra unites with the bulb.

From this pendulous part the bulb is continued along the urethra eaſily diſtinguiſhable by its bulk for nearly three inches; this continued body of cellular ſubſtance is bulky and turgid, occupies the whole length of the perinæum from the place where the ſcrotum hangs pendulous to the verge of the anus; it appears when diſſected, of a livid colour, from the blood it contains ſhining through its thin but

Anatomy of the Parts.
Second Sketch.

Explained page 15.

firm coats; it may be felt turgid during the erection of the penis; we are very ſenſible of the action of the muſcle with which it is covered during the ejaculation of the ſemen and of the laſt drops of the urine, for the whole length of the bulb is covered with the EJACULATOR URINÆ MUSCLE, of which the fleſhy belly with ſtrong oblique fibres running round the bulb, is marked (30); the tendon of the muſcle which is fixed into the ſide of the penis, ſo as to give the muſcle a powerful action upon the bulb is marked (31).

This muſcle the accelerator (which will be better ſeen in future drawings,) involves the whole bulb, conſiſts of two ſets of oblique fibres ariſing from one common ſeam along the middle of the bulb, and terminates in two broad flat tendons which lay hold on each ſide of the penis; it is from its office named EJACULATOR URINÆ ET SEMINIS.

The corpus cavernoſum urethræ (32) continues, though ſmaller, from the place of the ejaculator muſcle, and covers the whole of the urethra till it terminates finally in the glans penis.

The right corpus cavernoſum penis forming one ſide of the proper body of the penis, is marked (33) at the place where it is cut off from the os pubis whence it ariſes, and its bloody cells are ſeen in this cut ſurface.

The whole penis is ſurrounded beneath the common integuments (and above its proper coats) with a firm tendinous ſheath or faſcia, which prevents overdiſtenſion and binds it firm in erection, juſt as the faſcia common to muſcles gives them firmneſs in action; a part of this faſcia marked (34), is here diſſected and left hanging down, thin, but ſtrong and firm, and of a tendinous nature.

In this drawing the ſcrotum only is cut away, the ſkin of the penis is thruſt upwards along the body of the penis, and the penis is ſuſpended in a natural poſture by a tape.

SECOND DRAWING.

In this view the diſſection of the parts is perfect, they are now diſtinctly ſeen unincumbered with any other parts, and cleared of their cellular ſubſtance; the bladder, urethra, and penis, are laid out upon the diſſecting board, and that ſurface

of the bladder is turned upwards, which naturally lies upon the rectum, and which is the ſubject of our chief operation; this drawing is a neceſſary ſupplement to the firſt, in which not the preciſe form ſo much as the general connexions of parts is ſeen, and is a uſeful introduction to the third, in which the ſame parts together with the muſcles which compreſs the rectum and bladder are diſplayed.

The body of the penis is compoſed of two corpora cavernoſa which receive and contain the arterial blood poured into their cells; theſe cellular or cavernous bodies ariſe one on each ſide of the arch of the pubis from the branch of the os iſchium; they conſiſt of a ſtrong tendinous coat, from all parts of the ſurface of which thoſe abſorbing veins ariſe, which beginning in ſmall branches encircle the body of the penis and meet in one great trunk on the back of the penis, named the Dorſal vein; the corpora cavernoſa are divided from each other by a ſeptum or middle partition, but that partition is ſo perforated that the communications of the two corpora cavernoſa are as wide as the teeth of a large comb; ſo that the partition, inſtead of ſeeming to ſeparate the two lowermoſt bodies, ſeems chiefly uſeful by conducting two central arteries, which run up through the centre of the penis, and pour out blood, each into its reſpective ſide of the penis.

Thoſe two cavernous bodies are marked (a a) at the beginning where they ariſe from the arch of the pubis, and at (a a) are ſeen the cells; at (b) theſe two bodies unite and continue united to form the body of the penis; but the glands is differently formed, has little connexion with the body of the penis; is united with the body of the penis merely by cellular ſubſtance; and is formed of the corpus ſpongioſum urethræ.

The CORPUS SPONGIOSUM URETHRÆ begins not from any bone or other firm part; it commences in what is called the bulb of the urethra; the pendulous part of the bulb which lies cloſe upon the anus is marked (c), and in this drawing the pendulous part being very little inflated, makes no very remarkable figure; it is into the extremity of this pendulous part that the two arteries enter which pour their blood into it; the whole of the bulb which occupies the whole of the perinæum, is covered with the accelerator, and ſeems formed on purpoſe to give effect to that muſcle; the bulbous part of the urethra ceaſes at (d), where the accelerator muſcle ends, but the ſame cellular body (e e) (diſtinct from the corpora cavernoſa penis), accompanies the urethra the whole way, till, at the point of the urethra it is dilated ſo as to form the glans (f). After injecting this corpus cavernoſum ipſius urethræ with wax, we find innumerable ſmall veins filled, which emerge from the cellular

ſubſtance, encircle the penis, and form the vena dorſalis; theſe corpora cavernoſa of the penis and of the urethra, are in themſelves ſtrong, and are ſtill farther braced by a general ſheath or faſcia, ſuch as ſurrounds the muſcles of a limb formed of the ſame tendinous ſubſtance with the common faſcia, and in this drawing the faſcia of the penis is diſſected and pinned back to the diſſecting board; the faſcia penis is marked (g).

At (h) the corpus cavernoſum ipſius urethræ ceaſes, or is not yet formed; this part of the urethra is of courſe uncovered, naked, thin, conſiſting merely of the membrane of the urethra, and thence is named the membranous part of the urethra; this is the part which bends under the pubis, and is particularly tied to the arch; it is at this bending, and conſequently at the moſt delicate and unprotected part of the urethra, that the chief, difficulty is felt in introducing the catheter; it was when the point of the catheter touched this part of the urethra, that the old ſurgeons made, what they called, the "tour de maitre" or cunning turn, for they laid the catheter with its back or convexity to the pubis, and turned it round with its concavity toward the pubis only upon arriving at this point. Whether they turned it ſo from a ſenſe of the difficulty at this point, or to conceal the manœuvre and give an air of dexterity to what they did, ſignifies little; but the cauſe of this difficulty deſerves ſome notice. It is neither the ſwelling of the bulb, the fullneſs of the corpus ſpongioſum, the oppoſition of the proſtate gland, nor any of the uſually ſuppoſed cauſes, that prevents the catheter entering the bladder; the catheter is reſiſted in conſequence of the peculiar manner in which this part of the urethra is connected with the bone; for, firſt, the arch of the pubis is filled up with a ligament which is neceſſarily of a triangular form; this triangular ligament of the pubis is perforated for tranſmitting the urethra, which paſſes actually through a hole in it; on the outſide of the ligament lies the bulb, and at this point the ſeveral muſcles, the ACCELERATOR TRANSVERSALIS-PERINÆI, SPHINCTER-ANI, and LEVATOR, are all united. The pendulous part of the bulb which is alternately ſlackened and turgid, together with the looſeneſs of the urethra on the outſide of this ligament, allows a ſort of angle here; in every caſe, even the moſt ſimple, you feel a reſiſtance when the catheter reaches this point; and when you are ſucceſsful in introducing the catheter, it ſtarts ſuddenly over this obſtruction and then ſlides eaſily along, paſſing onwards ſome way after this ſudden ſtart, before it reaches the bladder, or the urine begins to flow. The ſurgeon who is accuſtomed with the

operation, by depreſſing the handle of his catheter, raiſes the point over this obſtruction, and introduces it with a degree of eaſe: the ſurgeon, on the contrary, who ſupplies the place of addreſs by violence, and puſhes the catheter hard at this point, is ſure to drive it into the ſubſtance of the bulb, and the blood inſtantly flows from the penis in a full ſtream as from a vein; but if having puſhed it thus through the membrane of the urethra, he continues to drive it onwards by main force, he may even, with the blunt catheter, perforate the bladder as with a trocar, for the catheter paſſes out of the urethra along the perinæum and into the bladder, either through the ſubſtance of the proſtate gland, or behind it: Rude as ſuch an operation is, it has been reſorted to in caſes of extreme neceſſity, by men of the firſt celebrity.

The MEMBRANOUS PART OF THE URETHRA, marked (i), is that which lies within the pelvis, the lower extremity of this part of the urethra is embraced by the opening in the triangular ligament, and in all its length (viz. about an inch and a half) it is cloſely tied to the arch of the pubis; this is the part of the urethra which turns under the arch, and which is eaſily felt, when the catheter being introduced we paſs at the ſame time a finger into the rectum; it is the part which the lithotomiſt ſeeks out with his finger, and which he eaſily diſtinguiſhes after having made the external wound.

Immediately beyond this membranous part of the urethra, and entirely within the pelvis, lies the proſtate gland (k) of the ſize of a very large walnut, and ſomewhat of the ſame ſhape, not divided into two lobes (as the old manner of deſcribing it in the plural number, proſtates, would imply) but one continued gland, ſurrounding the urethra and neck of the bladder entirely, though far the bulkier part lies below. It lies ſo behind the pubis that it is fairly contained within the pelvis; the apex or point of the gland touches the inner ſurface of the pelvis; the lower and bulkier part is flat with ſome ſlight appearance of being divided by a rapha or ſeam into the two lobes, it is firm and even hard, ſo as to be felt diſtinctly even in its natural condition, and when diſeaſed, it is ſo ſwelled as to compreſs the outlet of the pelvis, it flattens the formed fæces, and is too diſtinctly felt by the finger to be at all miſtaken. When we cut into its ſubſtance we find it divided into many little cells full of mucus; when we cut tranſverſely we obſerve that the two ſides of the gland are divided from each other by an intermediate membrane; when, without diſſecting the gland we merely ſlit open the urethra, we obſerve the numerous ducts by which the pro-

ſtate pours its mucus into the urethra; we remark ſeven or eight ducts on each ſide, each large enough to receive the point of a briſtle; and from thoſe ducts we can, by ſqueezing the gland, preſs out the mucus very freely.

The diſeaſed proſtate reſembles a ſcrofulous gland in any other part of the body, it is white, firm, colourleſs, it ſeldom almoſt never ſupperates; the enlargement of the gland is attended with no actual pain; the diſtreſs it occaſions is from irritation, perpetual deſire to paſs urine, without the power of paſſing it but drop by drop.

This diſeaſe, frequent in the decline of life, is diſtinguiſhed by the long continued irritation, the ſmall and thready ſtream of urine, the frequent fits of ſuppreſſion, the ſlow delivery of the urine drop by drop, the ſlow but regular increaſe of the obſtruction as age advances, till after frequent ſlighter ſuppreſſions of urine the neck of the bladder at laſt inflames, the obſtruction becomes compleat, the abdomen ſwells with pain and fever, the catheter, or even the ſmalleſt bougie will not paſs.

Though falls, bruiſes, and other cauſes of inflammation do ſometimes require that we ſhould tap the bladder and continue for a time to draw off the urine by the trocar; yet this diſeaſe of the proſtate, ſo frequent in old age, is almoſt the only one in which we need to perforate the bladder, with the deſign of leaving the trocar permanently in the wound.

The veſiculæ ſeminales marked (k k) lie upon the lower part of the bladder, betwixt it and the rectum; the veſciculæ are very firm and ſolid; they are of a white or bluiſh colour; they conſiſt of continuous cells fifteen or twenty in number, but they are not, as they have actually been deſcribed, a continuation of the vas deferens, for the vas deferens (l l) is hard, firm, very ſmall, and enters laterally or rather obliquely into the veſicula. Whether theſe be receptacles for the ſemen ſecreted by the teſticle, or whether they be full of a peculiar liquor, is a queſtion (however important in phiſiology) of infinitely little importance in ſurgery; this only we may be allowed to obſerve, that had there not been ſuch plain and obvious receptacles for the ſemen, phiſiologiſts would probably have been at no ſmall pains to diſcover ſome reſervoir in which, after being ſecreted, it might be retained for the moment of ejaculation.

Theſe veſiculæ lie ſo obliquely upon the lower and back part of the bladder, that they leave an open ſpace at (m), where according to ſome of the old methods of lithotomy, and eſpecially in that practiſed at one time by Cheſelden, the inciſion

was made; and where, when we perforate the bladder from the rectum, the trocar is ſtruck into the bladder: In this drawing the veſiculæ, (in conſequence of the cellular ſubſtance which naturally attaches them to the bladder being diſſected away) hang ſomewhat looſe, they fall away a little from the body of the bladder, and leave rather a larger ſpace than natural bare.

But it would be in vain to deſcribe thus accurately the veſiculæ ſeminales, the bulb of the urethra and the proſtate, without giving at the ſame time, ſome idea of the ſtructure of the urethra itſelf; I have therefore interpoſed here a ſlight etched plate which I deſigned at firſt for a marginal drawing. This ſupplementary drawing marked ETCHED PLATE OF THE URETHRA, is a ſketch of the internal ſurfaces of the urethra and of the proſtate gland; it is the urethra of fig. 2d. ſlit up and ſpread out, the parts being twiſted a little ſo as to turn the veſiculæ down under the bladder in order to ſhow what is called the veru-montanum, or little eminence formed by the entrance of the ſeminal ducts. (a) Marks the external ſurface of the flaccid bladder; (b) marks the folds into which the bladder falls in this flaccid and dead or uncontracted ſtate; (c) marks the eminence which the proſtate gland makes within the bladder; (d d) marks the cut ſubſtance of the gland; (e e) marks a longiſh eminence ſomewhat reſembling the frenulum linguæ: When you ſtand before a glaſs and turn the tip of the tongue to the roof of the mouth, you obſerve a little granule of fleſh ſtanding up in the middle of the frenulum linguæ, and on each ſide of it you ſee diſtinctly two ſmall papillæ by which the two ſub-maxillary ducts open under the tongue; in like manner in looking to the little eminence (e e) you remark two very minute openings which are the openings of the ſeminal ducts or of the veſiculæ; and theſe reſembling ſomewhat the eyes while the prominence ſlightly reſembles the head and long bill of a wood-cock, is the reaſon why this little part has been named the Caput Galinaginis. This little prominence then begins near the point of the proſtate gland, and runs onwards a little way into the membranous part of the urethra; and on each ſide of it are diſtinctly ſeen ſeven or eight openings by which the mucus of the proſtate gland is diſcharged into the urethra; for I ſuſpect the proſtate to be merely a mucous gland. This Caput Galinaginis I have drawn as I ſee it in the ſubject before me, and with little of that ferocious beak and ſtaring eyes which former anatomiſts have thought fit to give it; they have laid this diſſection before the engraver, explained to him the meaning of the term Caput Gallinaginis, while he has proceeded in his drawing with a hearty reſolution of making out the veritable likeneſs of the wood-cock.

Etched Plate of the Urethra
Explained page 20.

Drawn by T. Bell.

Engraved by E. Mitchell.

Next to this ſucceeds the membranous or naked part of the urethra; and of the whole of this membrane it will be remarked in this drawing, that it is ſtriated with long villi or folds running according to the length of the canal; that theſe folds enable the urethra to dilate to any ſize; and that in the depths of theſe folds or longitudinal rugæ, lurk the numerous glandular openings or lacunæ; of theſe lacunæ from twelve to fifteen marked (f f), are remarkably large, and one eſpecially; about an inch under the point of the glans is one marked (g), ſo large that the point of the catheter or bougie will eaſily enter it. Theſe lacunæ which ſecrete the mucus of the urethra are the proper and peculiar ſeat of gonnorrhea, and this large one marked (g), is eſpecially affected; there are few lacunæ in the membranous part which is of courſe rarely affected, and the proſtate gland or its ducts almoſt never. I have ſeen the diſeaſe reach the neck of the bladder accompanied with a pain in the abdomen, a profuſe flow of matter and an inceſſant deſire to make water, which was torturing to the laſt degree; but this kind of iſchuria ſeemed always to me rather an affair of ſympathy and irritation, than an actual inflamation of the neck of the bladder, and when properly treated ſeldom laſts many days.

The whole of this membrane which is naturally white, is ſo tranſparent that the blood ſhines through it, whence it has a general livid colour. In the rugæ where the glands or mucous lacunæ are ſeated, the membrane has more colour, becauſe it is more vaſcular; it is ſo tender that it is eaſily torn by falls or blows, wounded by the catheter, or eroded by ulcers, ſo that the blood flows freely from the cavernous ſubſtance. When particularly inflamed the membrane begins to grow and thicken whence ariſes ſtricture, for the ſame increaſe of ſubſtance or growth which produces tumor outwardly, forms ſtricture in a hollow tube, and here the ſtricture plainly conſiſts of a growth or thickening of the walls of the urethra, the cure of which is to be expected only from a total extirpation of the part; this is generally beſt effected by cauſtic, a method of cure for the diſcovering and perfecting of which the world is infinitely indebted to John Hunter and his ſucceſſor Mr. Home.

It will be underſtood from the view of theſe rugæ and lacunæ; firſt, why the urethra is ſo eaſily elongated or dilated as in erection, or in the paſſing of the ſtream of urine; ſecondly, why erection is always attended with a flow of mucus proceeding from the compreſſion of the mucus ducts, a diſcharge which the ignorant are apt to miſtake for a ſeminal weakneſs.

The whole of the urethra ſeems to have a degree of contractile powers, which prevents the iſſuing of the urine; but there is a particular faſciculus of muſcular

ſibres immediately ſurrounding the neck of the bladder, which ſerves as a ſphincter, and theſe fibres lie ſo directly under the proſtate gland, that they are named Muſculi proſtatici.

The general form of the bladder is in the ſecond drawing * correctly expreſſed; for the human bladder, as already explained, differs entirely in ſhape from that of the lower animals: The bladder in lower animals is from the inclination of their bodies, of a flaſk-like ſhape, the fundus large, and the neck ſmall and long; but in man the lower part of the bladder is very broad and large, and fills entirely the cavity of the pelvis; the lower part is not drawn out as in animals, into a long neck, but the urethra is implanted as it were upon the broad ſide of the bladder, and the proſtate gland together with the joining of the bladder with the urethra (which lies under the gland,) is the only part that can properly be named the cervix; the lower part of the bladder when compleatly inflated, ſhows two remarkable bulgings or ſacs which bulge out on each ſide of the rectum; theſe bulgings are marked (n n); the veſiculæ (k k) lie upon the lower part of theſe two lateral ſacs; the vaſa deferentia (l l) run obliquely into the veſiculæ; and behind the vaſa deferentia are the two ureters (o o) which enter the bladder about an inch behind the veſiculæ, and towards the ſide of them. (m) Is the flat part of the bladder, as formerly marked, into which we ſtrike the trocar in perforating the bladder from the rectum; while (p p) marks the part of the bladder into which the inciſion is made, when we perform the lateral operation of lithotomy, and into which the trocar is ſtruck when we tap the bladder from the perinæum, for then the operation is done by an inciſion reſembling that for the lateral operation.

Something of the ſtructure of the bladder is alſo explained in this drawing; the muſcular coat of the bladder is much talked of as a part ſuppoſed and only ſuppoſed, to exiſt, becauſe of the muſcular power which the bladder manifeſtly poſſeſſes; but the muſcular coat of the bladder is as diſtinct as the platiſma myoides or muſcular covering of the neck, and is nearly as ſtrong. In this drawing the muſcular coat of the bladder is not caricatured, but fairly and ſimply drawn, nor is this bladder diſeaſed for it is large and was in this ſubject (a ſtrong big man) perfectly tranſparent in the interſtices of theſe muſcular fibres.

The three coats of the bladder are; firſt, the peritonæal coat, which is marked (g g), while the continued membrane of the peritonæum is thrown out upon the

* We now return to the explanation of the ſecond drawing.

board marked (r); this is the part of the peritonæum which lines the abdominal muſcles and is reflected upon the bladder. This peritonæal coat reaches no lower than (s s) for all the back part of the bladder (m) is connected with the rectum by looſe cellular ſubſtance; the ſides and bulgings (p p) lie under the tuber iſchii, and are alſo connected with cellular ſubſtance, while all the forepart of the bladder where it lies againſt the pubis, is connected by looſe cellular ſubſtance with that bone.

The ſecond or muſcular coat, the DETRUSOR URINÆ is here without any art or diſſection very diſtinctly ſeen; the cellular ſubſtance is merely taken off and the muſcular faſcia appears in this back part of the bladder, and eſpecially in the hollow betwixt the two lateral ſacs, compoſed of ſtrong bands of red and fleſhy fibres, croſſing each other; and all over the ſides of the bladder the faſiculi are ſeen running in a circular direction.

This muſcular coat is ſo compleatly formed, even in a child, that upon injecting the arteries in a boy with ſize, the fleſhy fibres of the bladder take on colour ſo particularly, that the muſcle of the bladder appears of a deep red, and all its faſciculi are diſtinctly ſeen.

The third or villous coat, which lines the bladder, is a thin but firm membrane, with a ſmooth ſecreting ſurface ſimilar to the internal ſurfaces of the æſophogus or rectum; it is leſs liable to diſeaſe than the ſecond coat; the villous coat is often found where the muſcular is ſo thickened as to conſtitute diſeaſe.

The bladder is not only fleſhy, but this muſcle of the bladder is the moſt irritable in the body, and the moſt ſubject to ſympathies. Thickening of the bladder is almoſt as frequent as thickening of the ſubſtance of the heart. Of thoſe men in a regiment who are obſerved to go frequently out of the ranks, the bladder is found after death to be as ſmall (and almoſt as ſolid) as an orange; this contraction of the bladder proceeding at firſt from irritability, and confirmed by habit, increaſes as men advance in years, and is particularly frequent towards the decline of life, when the muſcular coat being thickened and the ſphincter paralyſed the powers of expulſion and of retention come to be ſo nearly balanced, that the ſlighteſt irritation cauſes a diſcharge of urine, and in courſe of time a ſtillicidium urinæ or perpetual dribbling of the urine comes on. This ſimple thickening and contracted ſtate of the bladder, though it occaſions uneaſineſs and a frequent call to diſcharge the urine, yet amounts not to diſeaſe, while the urine continues pure and tranſ-

parent; but when the urine is thickened with great quantities of mucus, and when pain accompanies the contraction, when heat does not abate the irritability; when the patient rifes frequently during the night to void his urine, and voids it with preffure and pain, the villous coat or lining of the bladder is difeafed. And in this fchirro-contracted-bladder, we find the mufcular coat on the internal furface remarkably fafciculated, the fafciculi croffing each other like the mefhes of a net, while the internal furface is divided into innumerable cells, correfponding with the intrications of the fibres, and deep enough to receive the point of the thumb; I have in fuch cafes feen the fibres thick enough to refemble the columnæ carnæ of the auricles of the heart.

Whether the means which I have imagined for the dilatation of a bladder beginning to be thus contracted will be fuccefsful in every cafe, I dare not pretend as yet to decide.

THE THIRD DRAWING

Shows, among other circumftances of the anatomy of thefe parts, another mufcle the LEVATOR-ANI which equally belongs to the bladder and rectum; its office is common to both, it refifts the defcent of thofe parts when they are preffed from above by the diaphragm. This drawing is taken from a vertical fection of the pelvis; the haunchbone of the right fide is torn off; the pubis and os ifchium are cut acrofs; (a) marks the furface of the facrum from which the os ilium is feparated; (b) marks the fymphifis pubis from which the penis is fufpended by a ligament; (c) marks the cut branch of the os pubis; (d) the ramus or branch of the os ifchium alfo cut acrofs; (e e) marks the lumbar fpine; (f f) the tranfverfe proceffes of the vertebræ of loins; (g) marks the os coxygis; and thus we have the limits of the pelvis indicated. The contents of the pelvis as reprefented in this view are connected as follows: (11) Firft the line of the peritonæum feparates the cavity of the abdomen from that of the pelvis; fecondly, the upper part of the bladder, covered by the peritonæum, is feen projecting above the cavity of the pelvis, while the lower part (h) is feen below the line of the peritonæum embeded in a very loofe cellular fubftance; thirdly is feen the rectum, or rather the fygmoid flexure of the colon at that point where it makes its moft fudden turn at the top of the pelvis, and at (i) this inteftine having paffed behind the peritonæum or lining membrane of the abdomen, affumes the name of rectum or ftraight gut, becaufe here it runs directly

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Third Sketch.

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down in the hollow of the ſacrum, lies juſt behind the bladder, and in contact with it, and is embeded along with it in the ſame looſe cellular ſubſtance: The gut terminates finally in the anus at (k).

Among the cellular ſubſtance of the pelvis the ſeminal ducts and ureter paſs into the bladder; firſt, the vas deferens (l) going down behind the peritonæum runs along the lower and back part of the bladder, and paſſes into the bladder, at (m) with ſo oblique a courſe that the obliquity of its entrance ſerves as a valve, and though we can inflate the bladder from the ureters, we can, after tying the urethra, preſs the air back into the ureters ſo as to empty the bladder; ſecondly, the vas deferens (n) riſes over the pubis, paſſes down along the back part of the bladder, and runs for a little way, ſide by ſide, with the veſicula ſeminalis, before it enters into it; thirdly, the veſicula ſeminalis (o), is ſeen in this diſſection, lying betwixt the bladder and rectum, the end of the veſicula only projecting from betwixt the bladder and rectum, while the head of it lies cloſe under the bladder and beneath the proſtate gland; fourthly, the blood veſſels of the pelvis lie alſo behind the peritonæum, and in the looſe cellular ſubſtance by the ſide of the rectum; the internal iliac artery (p) ſoon divides into the great trunk (g) which contains the gluteal and ſciadic arteries, and the common pudic artery (r) which ſupplies all the important parts within the pelvis, and from which the branch (s) goes to the bladder and veſiculæ ſeminales, ſpreading round the place where the ureter enters the bladder; (t) another and a larger branch paſſes under the levator-ani muſcle to the verge of the anus, and emerging there runs along the accelerator urine muſcle, and from its place on the perinæum is named the perinæal artery; while the third and main branch of the artery marked (u), goes directly to the root of the penis, and immediately plunges one branch (v) into the cellular ſubſtance of the bulb, and another at (w) into the corpus ſpongioſum penis.

But the point of this drawing which is in every ſenſe the moſt intereſting; which is both the moſt curious in reſpect to the ſtructure of theſe parts, and the moſt important for the ſurgeon to remember, is the LEVATOR-ANI, the muſcle which lines the pelvis below, cloſes the outlet, and ſerves as an antagoniſt to the diaphragm. The LEVATOR-ANI ariſes from all the borders of the thyroid hole, from the inner ſurfaces of the os pubis and os iſchium, even to the ſpinous proceſs of the iſchium; its fleſhy fibres are big and ſtrong, and lie in a converging order, for they riſe from a broad origin, and are drawn together, fan-like, into a narrow inſertion; they all converge towards the opening of the anus when they are implanted into the

Sphincter Ani. From this muſcle cloſely encircling the rectum, and from its obvious effect in raiſing the rectum, it has been named Levator Ani, and no farther inquiry made into its mechaniſm or action; but it is proper and natural to conſider its relation to all the contents of the pelvis, and to the cavity of the abdomen, in a more general way. FIRST—it is to be obſerved, that ſince it was neceſſary that the opening of the pelvis ſhould be cloſed below, ſo as to prevent protuſions of the bowels (in conſequence of gravitation and the force of reſpiration,) and as an expanded ligament could not be a proper ſupport for the viſcera, this great muſcle was formed! which, by contracting in proportion to the ſtate of the parts, ſupports them continually: SECONDLY—it was neceſſary that the pelvis ſhould be cloſed below, not merely for the ſupport of the viſcera but for the ſake of reſpiration, therefore, the Levator Ani ſince it cloſes the whole opening of the pelvis and re-acts upon the diaphragm, muſt be conſidered as an antagoniſt to the diaphragm, and as giving effect to its action as much as the abdominal muſcles; for while the abdominal muſcles cloſe the abdomen on the forepart, the levator ani cloſes the abdomen below: THIRDLY— it was eſſential to this muſcle performing its office, that no point ſhould be left open; and therefore the levator-ani mixes its fibres with thoſe of the muſcles of the perinæum, firſt it is implanted directly into the ſphincter ani, of which it is not an antagoniſt, but a part. Their actions are not oppoſite but ſynchronous; in the common acts of reſpiration and in coughing, ſneezing, &c. the emptying of the rectum is prevented by the conſtruction of the ſphincter ani, and the action of the diaphragm is counteracted by the re-action of the levator ani; but when the fæces are to be diſcharged, the ſphincter ani is relaxed ſo as to leave the end of the rectum open, and the levator ani is alſo relaxed, and no longer reſiſts the preſſure of the diaphragm, whence the anus in the paſſing of the ſtools is protruded; but when the fæces have paſſed, the ſphincter ani acts, by which the opening of the rectum is cloſed; and the levator ani is alſo reſtored to action, and reſpiration goes on in the uſual way, after being interrupted by that long inſpiration which is neceſſary in expelling the fæces.

The Levator Ani then is inſerted into the ſphincter ani, and they are as one muſcle; it alſo has a faſciculus of fibres which paſs over the membranous part of the urethra, and is implanted into the root of the bulb, ſo that the levator is particularly connected with the accelerator urinæ, or muſcle of the bulb. All the muſcles then diſplayed in this drawing, as the Levator Ani (x x x); the Sphincter Ani (y); the Accelerator Urinæ, or muſcle of the Bulb (z); are all connected as one great muſcle,

an antagoniſt to the Diaphragm. The faſciculus of the levator which proceeds from the lower part and inner ſurface of the pubis, and which in a particular manner embraces the membranous part of the urethra, and connects itſelf with the bulb I have marked with an (*), becauſe I think it particularly important for the lithotomiſt to remark this piece of mechaniſm. Let the ſurgeon obſerve then that this muſcular aparatus cloſing the pelvis below, is compleat and connected at every point; that the Levator, Sphincter, and Accelerator, are all united in the perinæum; that no opening in the muſcle is left, except as in the other abdominal muſcles, ſmall foramina for the paſſage of blood veſſels; but except the ſmall openings for the paſſage of the perinæal arteries and veins, all is cloſe here, and even the urethra does not paſs without being covered by its own muſcle, which is connected with the others. Let the ſurgeon then take notice that at the place where the line proceeding from the mark (*) terminates, is the particular faſciculus which covers the membranous part of the urethra; that at the place where the mark (*) itſelf is placed, the proſtate gland lies under the body and moſt fleſhy part of the levator muſcle; by comparing the place of the veſiculæ ſeminales (o) with the bulb of the urethra (z), he will ſee that the parts which are the aim of the lithotomiſt, viz. the membranous part of the urethra, and the proſtate gland, lie ſo covered by the levator ani, that without cutting through this muſcle, we cannot reach them; that what is called the membranous part of the urethra is not left altogether uncovered, but is to be felt naked only from within, either by putting the finger into the anus after introducing the ſtaff, (when the ſtaff will be felt as diſtinctly as if not even a membrane were interpoſed) or after the inciſions of lithotomy; for when theſe are correctly performed, when not only the ſkin is divided, but the muſcle at (*) fairly diſſected, the finger of the operator is admitted deep, he touches a point far behind the margin of the anus, and feels the membranous part of the urethra and the almoſt naked ſtaff from one ſide.

Fourthly, the relation of this muſcle to the bladder muſt be obſerved, for it is more a muſcle of the bladder than of the rectum, and all the painful ſympathies and ſtrainings of the bladder, and eſpecially the perpetual deſire to make urine in piles and other diſeaſes of the rectum, proceed from the contractions of this muſcle. From the manner in which this muſcle is wrapped round the rectum it would be natural to imagine it muſt have ſome influence in emptying the rectum, while in fact it can have none, for while the fæces are paſſing, the ſphincter is relaxed, and when the ſphincter is relaxed, the whole

levator muſcle muſt be relaxed, becauſe its fulcrum or inſortion is gone. But when the fæces have paſſed, and the ſphincter contracts, the levator ani recovers its action; and when the anus is at once cloſed and retracted, the levator compreſſes the bladder, becauſe the rectum is emptied and cloſed; and in proof of this let it be remarked, that though we cannot go to ſtool without at the ſame time paſſing our urine, we never paſs the urine and fæces at once, but ſucceſſively; firſt, the ſpincter ani is relaxed, and the ſuppreſſion of the breath and the ſtrong action of the diaphragm expels the fæces; ſecondly, the opening of the rectum is cloſed, the anus is retracted, and then the levator, reſuming its action, begins to affect the bladder; thirdly, the ſphincter of the bladder is relaxed, and the levator compreſſing all the contents of the pelvis, expells the urine ſtrongly and with ſuch irritation, that though the bladder had been previouſly and completely emptied, the laſt contractions of the levator in retracting the anus, empty the bladder even of the few drops that may remain in it.

What then is the teneſmus which is attended with ſuch an irritation and intenſe deſire to paſs urine? It is not, as uſually defined, a continual deſire to paſs the fæces, but a continual deſire to ſuppreſs this action, a continued retraction of the rectum, which is of courſe attended with a frequent action of the levator upon the bladder accompanied with perpetual irritation and deſire to make water.

THE FOURTH DRAWING

Exhibits a ſtage of the diſſection peculiarly intereſting, for the levator muſcle being diſſected, cut away from its origin and turned down, the rectum, the bladder, the proſtate gland, are diſplayed; and the connections of the membranous part of the urethra with the pubis, and the ſeveral forms and relative ſituations of the bulb, membranous part of the urethra, proſtate and veſiculæ, are completely diſplayed. This is the intereſting part of the diſſection of theſe parts, for this is the place where we meet with the chief difficulty in introducing the catheter, and at this point we make the moſt critical part of the inciſion for lithotomy.

But before I call the attention of my reader to this main point of the demonſtration, I ſhall firſt explain the ſubſidiary parts of the drawing, or in other words, the manner in which the diſſection was prepared for taking this particular view.

The ſygmoid flexure of the colon is ſeen hanging over the edge of the peritonæum ſupported by a piece of tape. The Apendices Epiploicæ which characteriſe this part of the inteſtinal canal, are ſeen at (a a); at (b b) is ſeen the edge of the perito-

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næum, where it paſſes from the back part of the bladder over the forepart of the rectum and colon; at (c c) is ſeen the cut edge of the peritonæum, where it forms the outer coat of the colon, and the nature of the peritonæal coat of the inteſtines in general may be conceived from this drawing; at (d d) the inteſtine being uncovered of its peritonæal coat, its fleſhy fibres intermixed with pelotons of fat is diſplayed; and (e e) the fat which lies under the peritonæum hangs in large maſſes.

Next we have to remark again the parts which lie properly within the cavity of the pelvis, under the peritonæum; firſt, the body of the bladder (f) with ſeveral pelotons of fat adhering to it; the Ureter entering obliquely into it at (g), and the Vas Deferens paſſing down behind it to enter into the Veſicula Seminalis at (h); below this the Rectum is ſeen at (i i), with its looſe cellular ſubſtance falling out of the pelvis, becauſe it is no longer contained and ſupported by its proper muſcle, the levator ani; and at (k) the Veſicula Seminalis is ſeen lodged betwixt the rectum and bladder.

The bones of the pelvis which appear in this ſketch are only thoſe of the pubis and iſchium; the body of the pubis is marked (l); the branch of the iſchium which is cut near its tuberoſity, is marked (m); the intermediate ſpace which is a part of the circle of the thyroid hole has ſome rags (n n) of the levator ani muſcle adhering to it; the ſymphiſis pubis, marked (o), has the root of the penis connected with it by a ſort of ligament; and the crus penis of the right ſide (p) is ſeen riſing from the branch of the iſchium, while the body of the penis, with its ſkin half diſſected and turned forwards, is ſeen lying out in the direction (g); the accelerator urinæ muſcle (r) is diſſected off from the bulb and hangs down, while the levator ani being cut away from the bones is inverted and laid down; it is marked (s) and lies over the maſs of fat which ſurrounds the anus (t), and it is the ſmooth inner ſurface of the levator ani that is here expoſed; the ſize of the muſcle and its ſtrength of fibre is beſt underſtood from the preceding drawing.

Theſe are the accompaniments of this view which is chiefly intereſting in that one point, where by the turning down of the levator ani, the gland and membranous part of the urethra is expoſed: *Firſt*, (1) marks the body of the urethra ſurrounded by its proper and peculiar cellular ſubſtance: *Secondly*, the bulb marked (2) lies in the part of the perinæum neareſt the verge of the anus: this is what is called the pendulous part of the bulb, and it ſhould be again remarked that no part of the bulb is within the cavity of the pelvis or is at all connected with the bones, it lies merely in the perinæum: *Thirdly*, it muſt be particularly noticed

that the membranous part of the urethra (3) lies directly under the middle of the arch of the pubis, and is connected with it, not merely by common cellular ſubſtance, but by paſſing through a hole in that triangular ligament, which fills the arch of the pubis: *Fourthly*, it muſt alſo be particularly noticed that the proſtate gland being behind the membranous part of the urethra, is entirely within the cavity of the pelvis, it is marked (4), and, like the membranous part of the urethra, is only to be felt after paſſing the finger within the rectum, or after having performed the inciſions for lithotomy, or for tapping the bladder; fifthly, it is to be obſerved that there is a ſpace marked (5) behind the proſtate, betwixt it and the entrance of the ureter, which is incorrectly named the neck of the bladder; for the neck of the bladder is that part which is embraced by the proſtate gland, while this part behind the gland, is truly the body of the bladder; it is the biggeſt and moſt capacious part of the bladder; it is the great lateral ſac formerly ſo particularly remarked in explaining the ſecond drawing.

Now this drawing enables me to point out at preſent, in a correct manner, the place of the ſeveral inciſions in lithotomy, and to reaſon afterwards upon the mechaniſm of theſe parts with a perfect conviction that my reader muſt underſtand me.

When Cheſſelden firſt imitated the operation of Frere Jaques, although Frere Jaques often miſſed his intended ſtroke in the body of the bladder, Cheſſelden never did ſo; he did not mangle the parts, but, by his ſkill in anatomy, cut direct into the part of the bladder marked (5): but it was an inciſion ſo deep, ſo oblique, and paſſing through ſuch looſe cellular ſubſtances, that many of his patients died of ſuppurations within the pelvis.

When Raw and Cheſſelden and other ſkilful Lithotomiſts cut with the knife, independant of any rules, or rather traditions, concerning the operation of Frere Jaques, they firſt entered their lithotome or pointed ſcalpel, into the membranous part of the urethra, and ran it directly onwards into the cavity of the bladder, through the body of the proſtate gland, uſing the knife as they would have done a lancet in opening any great abſceſs or diſeaſed ſac; this form of inciſion was very ſucceſsful.

When Sir Cæſar Hawkins invented the cutting gorget, which makes the inciſion in a lateral direction, the ſurgeon began the critical part of the inciſion, viz. that into the bladder, by firſt ſlitting up the membranous part of the urethra, marked (3), almoſt its whole length, and then introducing the beak of the gorget by that ſlit,

and running it onwards along the groove of the ſtaff into the bladder. The cutting edge of the gorget completed the internal inciſion, by paſſing through the body of the proſtate gland in the lateral direction marked (6).

This is the operation which modern ſurgeons have choſen; which of thoſe various methods ſhould be preferred will form an intereſting part of the following diſſertation; and in a ſurgical queſtion like this every argument muſt have reference to theſe ſucceſſive views of the anatomy of the parts.

But whichever operation we perform, the courſe of the great blood veſſels is particularly to be reſpected, the arteries peculiar to the penis are therefore diſſected in this view; (u) marks the trunk of the arteries belonging to the pelvis; (v) marks the poſterior iliac artery, or the great artery which turns out of the pelvis through the ſciadic hole, and ſupplies the glutæal muſcles; (w) marks the track of the Pudic artery, or the Arteria Pudica Communis, for it is the common trunk from which all the individual arteries of the private parts ariſe; (x) marks that great artery which fills the ſpongy bodies of the penis with blood, and which having reached the arch of the pubis, divides into two conſpicuous branches; firſt, (x) which is the continued trunk, and which, running up under the arch of the pelvis, enters into the crus penis, and pours its blood into the cells of the body of the penis; from this trunk a branch marked (y), rather ſmaller, curling, and about two inches in length, turns downwards and enters into the bulb of the penis, and fills the bulb and the corpus cavernoſum ipſius urethræ, and of courſe the glans, which is a continuation of it, with blood.

The Artery of the Perinæum is marked (z); it goes off from the pudic artery, where it lies under the tuberoſity of the os iſchium, runs curling along the gut, emerges betwixt the anus and the root of the penis upon the perinæum; it is this artery that is ſeen in the fifth drawing, running along the bulb; it is the artery, not of the bulb, but of its muſcles, for it gives branches to the accelerator fat and ſkin, but not to the cavity of the bulb; it is the ſuperficial artery of the perinæum.

From the view here given of theſe arteries, it might be ſuppoſed, that, in performing the inciſions of lithotomy, they could not eſcape the knife; but upon recollecting the relative ſituation of all the parts, it will be found that the arteries (x y) belonging to the root of the penis, run on the outſide of the levator ani muſcle, cloſe under the protection of the bone; that the perinæal artery (z), the only one which departs from this general courſe, runs ſuperficially upon the perinæum, and muſt be divided in cutting the muſcles, i. e. in making the part of the inciſion

which carries the finger of the operator into the great hollow by the ſide of the rectum, under the tuber iſchii. But though the perinæal artery is alway cut, it gives out but little blood, and ſoon ſhrinks. All the three arteries in fact might be cut without danger, after their diviſion; danger reſults from ſuch wounds only when the trunk of the pudic artery is divided where it runs along the inſide of the tuber iſchii, an accident which frequently happened in cutting with the biſtonri of Frere Coſme, and ſometimes it happens to the modern ſurgeon in cutting with too broad a gorget.

THE FIFTH DRAWING

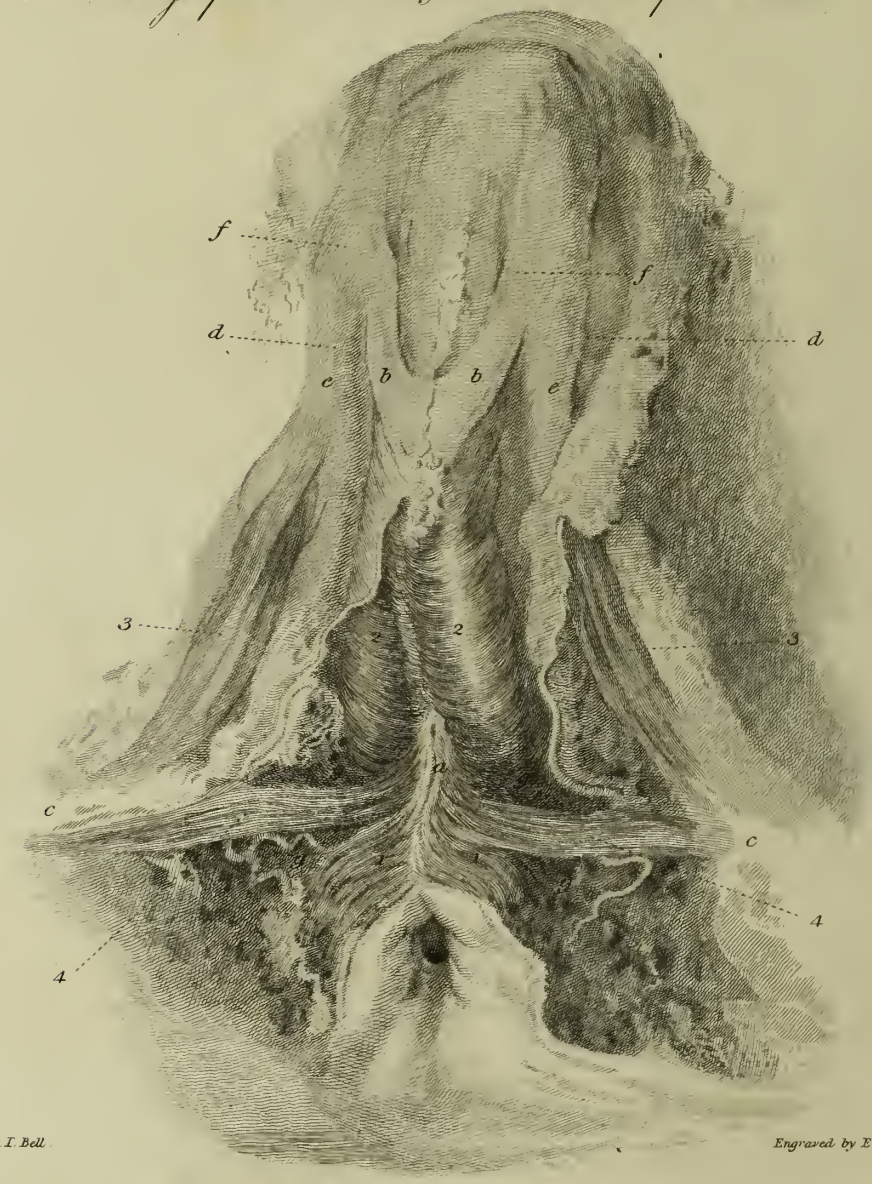
Will make this piece of anatomy compleat, by demonſtrating thoſe muſcles of the perinæum, which, though leaſt important in the operation of lithotomy, have been moſt circumſtantially, though I cannot ſay moſt correctly, deſcribed.

The perinæum with its muſcles and arteries is here preſented directly to view; the muſcles are four in number, the Erector Penis, the Accelerator Urinæ, the Sphincter Ani, and the Tranſverſalis Perinæi; and the branches of the perinæal artery are two only, one running forwards along the bulb, and the other running backwards upon the ſphincter ani and cellular ſubſtance that ſurrounds it. To draw this view, the ſkin and about an inch of fat was diſſected off; then the faſcia of the perinæum (a thin ſheet of tendinous matter mixed irregularly with the cellular ſubſtance) being carefully diſſected away, diſplayed the muſcles and arteries; but in the great hollows under the tuberoſities of the iſchium, the fat cellular ſubſtance and tendinous fibres are left ſurrounding the arteries, where they emerge from the pelvis; the faſcia or general tendinous ſheath of the penis under which the anterior branch of the perinæal artery runs, is diſſected and turned to one ſide, and the penis is turned backwards over the pubis, covered by its ſkin, which is rolled back along with it. Theſe are the parts which are to be now more particularly deſcribed.

Firſt, The opening of the anus has the ſkin of the perinæum cut very cloſe round it in order to diſplay the ſphincter ani, a big, thick, and fleſhy muſcle which encircles the anus and connects itſelf with the accelerator urinæ muſcle, by a ſlip of muſcular fibres. This is the External or great Sphincter it is marked (1), and the ſlip of muſcular fibres by which it connects itſelf with the accelerator, is marked (a).

Secondly, The Accelerator Urinæ and Seminis, marked (2), is a very

Anatomy of the Parts. Page 33. — The Fifth Sketch.



Drawn by I. Bell. *Engraved by E. Mitchell.*

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large muſcle with ſtrong fleſhy fibres; it covers the whole length of the bulb, and is divided properly into two muſcles, by the rapha or middle ſeam of the perinæum, and the acceleratores (for they ſhould be named in the plural number) are much more diſtinct in their inſertion than in their origin; for two oppoſite ſets of oblique fibres begin in the rapha or ſeam, and, after covering the whole bulb, terminate in two diſtinct and oppoſite tendons, marked (b b), which go off obliquely from the body of the urethra to expand upon the bodies of the penis on each ſide.

Thirdly, There is another pair of muſcles belonging to the body of the penis, marked (3 3); theſe lie entirely to one ſide of the bulb and form the perinæum into a triangular ſhape; they lie fairly upon the two crura penis, and are named ERECTORES PENIS; and from their origins being in the tubera iſchii, and their inſertions in the cavernous bodies of the penis, they are often named ISCHIO-CAVERNOSI. The Erectores then ariſe by ſmall and pointed tendons from (c c), the tuberoſities of the oſſa iſchii; they are rounder in their bellies than the acceleratores which are flat; they have an almoſt equal mixture of tendinous and muſcular fibre; they are about three inches long; one half of each muſcle lies upon the bone from which it ariſes, while the other lies along the crus penis. The two erectores are implanted into the cavernous bodies of the penis, near the place where the oblique tendon of the accelerator is inſerted; the crura penis are marked (d d); the bellies of the erectores (3 3); their inſertions (e e); and the inſertions of the accelerator tendons, is marked (f f).

Fourthly, A muſcle the leaſt in ſize, but in the conſideration of the ſurgeon the moſt remarkable, is the TRANSVERSALIS PERINÆI (4 4). The tranverſe muſcles of the perinæum are well named, becauſe they paſs directly acroſs the perinæum. The accelerator is a ſuperficial muſcle, becauſe it lies upon the bulb, which is in the central and moſt prominent part of the perinæum, covered only with ſkin faſcia, and ſome more common cellular ſubſtance, while the tranverſe muſcles lie deep in the hollow under the tuber or moſt prominent part of the iſchium, embedded in that ſolid fat which ſurrounds the lower part of the rectum. Theſe tranſverſe muſcles are not eaſily found by the ſtudent in his firſt diſſections, and not always fairly cut by the lithotomiſt; they ariſe from the tuber iſchii at (c c); they lie deep, and croſs not ſo properly the perinæum itſelf as the hollow under the tuber iſchii; they are joined at their inſertions both with the ſphincter ani and with the back part of the accelerator; their relation is rather to the anus than to the penis; they raiſe

the anus after it has been protruded, and ſerve to complete that muſcular apparatus with which the pelvis is cloſed below. All theſe muſcles are neceſſarily connected with the levator ani, for the levator encircles not only the rectum and bladder but the membranous part of the urethra, and the ſphincter, levator, accelerator, urinæ; and tranſverſalis perinæi, all meet in this central point.

How and in what direction theſe muſcles are cut in lithotomy any one who knows them correctly cannot fail to underſtand, this only being premiſed, that the operation of lithotomy requires no ſlitting up of any length of the urethra; that the bulb of the urethra ſhould not be touched; that it ſhould be the aim of the operator to make his way to the neck of the bladder by the great hollow marked (g); it is a hollow under the tuberoſity of the iſchium (c), betwixt the bone and the rectum filled chiefly with fat, and from which the perinæal artery emerges. It is manifeſt that ſince the bulb is not to be cut in the operation of lithotomy, the accelerator is not to be touched with the knife; it is equally obvious that as the inciſion is to be made into the hollow under the tuber iſchii, the erector penis is as much to the outſide of the inciſion as the accelerator is to the inſide of it; and it is equally obvious that in order to cut into the hollow under the tuber iſchii, that muſcle muſt be cut acroſs, which, from its running acroſs and barring the perinæum, is named tranverſalis; and moſt of all it is to be remembered, that within this tranſverſalis muſcle, which itſelf lies very deep, covered often with two or three inches of fat, lie the ſtrong fibres of the levator ani, which muſt be diſſected before the Proſtate Gland can be diſtinctly felt, and that the deeper part of the external inciſion (that diſſection, viz. which is made by the guidance of the fore-finger after the ſimple inciſion of the ſkin) conſiſts in the diſſection of the tranſverſalis and levator muſcles, which muſcles can neither be ſeen nor even diſtinctly felt during the operation, but are to be recogniſed by the oppoſition or croſſing of the ſtrong fibres, which the ſurgeon is ſenſible of at the place where the muſcle is known to be; and by the thickneſs of parts interpoſed betwixt the finger and the proſtate gland.

It is right that a ſurgeon ſhould conſider then the muſcles which are to be cut in the operation of lithotomy, not as conſtituting a rule for operating, nor as wounds implying any peculiar danger! for it were of no conſequence, though every muſcle here enumerated were cut acroſs, and many a ſurgeon has cut his way to the neck of the bladder ſafely and ſucceſsfully without knowing through what muſcles he had made his inciſion, or that the proſtate gland was the point to which his in-

cifions tended. The mufcles then are to be regarded not as parts in themfelves dangerous to wound, but, as marking the true courfe of the incifion, which is perfect only when the tranfverfalis and levator mufcles are completely diffected.

It will next be fatisfactory for the furgeon to know the manner in which the perinæal artery comes out from the great hollow under the tuber ifchii; fo that diffecting his way into that hollow, he may not be alarmed when he fees the jet of blood from the perinæal artery, which he knows muft be inevitably cut; the perinæal artery, he is fenfible, will bleed more or lefs powerfully in proportion to the fize of his fubject, and does not delay the extraction of the ftone on account of the hæmorhagy from an artery which he is acquainted with and is not afraid to divide: for, as the operation goes on, the perinæal artery, which at firft bleeds furiouffly, fhrinks and ceafes to bleed.

Here then I will venture to clofe my defcription of this piece of anatomy which contains the facts on which we are to reafon, and the mechanifm to which I fhall hereafter appeal for the truth of every theoretical conclufion and the correctnefs of every rule of practice. I look upon my reader as qualified by thefe defcriptions and drawings, to go unaffifted through thofe preliminary diffections, without performing which, it is a facrilege to attempt this operation upon a fellow creature. The ftudent will, upon diffecting the fkin and cellular fubftance of the perinæum, fee firft the bulb of the urethra covered with the ftrong fleffy fibres of the accelerator mufcle; he will remark the courfe of the perinæal arteries and veins of each fide, which he will next diffect away along with the fat: Upon diffecting deeper and towards the hollow under the tuber ifchii, he will find a fecond ftratum of cellular fubftance more fibrous, mixed with ftrings of fafcia, and there he will find the tranfverfe mufcle of the perinæum: upon diffecting ftill deeper and feeling with his left forefinger, as he goes on, he will, among the fat of this great hollow, perceive the refiftance of the levator ani mufcle, for it lines the whole pelvis and covers the parts which he wifhes next to feel: upon diffecting through this fleffy thicknefs, ftill guiding the incifion with the point of the left forefinger, he will be fenfible of having cut through the flefh of this mufcle by diftinguifhing the urethra and proftate gland: upon laying his finger at firft upon thefe parts, he will hardly diftinguifh any thing, and will be apt to miftake the catheter for the bone; but by moving the catheter with the right hand, and feeling with the forefinger of the left, he will recognize the membranous part of the urethra (directly under the arch of the pubis and clofe upon the bone) and through that membranous part he will feel

the catheter diſtinctly ; then running the finger backwards along the catheter he will loſe that diſtinct feeling of it, becauſe the catheter is covered at that part with the proſtate gland ! at firſt he hardly believes that the thickneſs he feels covering the catheter is really the gland, becauſe in the dead body the gland is often ſoft, flabby, and not firm and ſolid as might be expected ; but paſſing his finger ſtill farther back he again feels the catheter diſtinctly through the thin coats of the bladder behind the gland ; and then bringing his finger forwards again, he looſes the catheter and feels it again when he comes to the membranous part of the urethra ; thus recognifing all the intermediate ſpace as the thick gland concealing the catheter. Next, upon making thoſe who aſſiſt in his diſſection, preſs down the bladder from above the pubis, he will feel the tenſe bladder and the fluctuation of the water in it below, and will be ſenſible how eaſily he could ſtrike the knife into the bladder, and drawing it forwards cut through the proſtate, and perform one of the operations for lithotomy, and that by no means the moſt eaſy or common : and he will next, by diſſecting the parts out of the pelvis, and laying them on the table, recognize the parts more diſtinctly ; will feel the tenſe bladder, the gland, the naked part of the urethra, once more ; he will now recollect the feelings thoſe parts conveyed to him while he was diſſecting from without, by the guidance of his forefinger, and will thus learn to cut forwards deciſively to that preciſe point of the bladder which, in operating, he may chooſe to ſtrike with his knife.

To my reader I now appeal in the moſt ſerious manner, and intreat him to repeat, frequently, theſe diſſections and leſſons, whether he deſigns to become a lithotomiſt or merely to be as much acquainted as every practical ſurgeon ſhould be, with the anatomy of theſe parts. In the courſe of ſuch a methodical diſſection he will diſtinguiſh the parts more correctly than he would believe ! the difficulties he may have conceived will vaniſh when he goes ſeriouſly and deliberately through this practical leſſon ! while he feels the body of the bladder and the fluctuation of the water in it with the point of his finger, he will perceive that his knuckles are buried in the wound, and will thus learn how deep his inciſions muſt be in a big and luſty man, and will thence learn to perform thoſe deep inciſions with ſteadineſs and ſelf-poſſeſſion. How it is poſſible to do ſo without ſuch preliminary diſſections I do not know ; and it does amaze me that any man can, for any earthly object of reputation or of preſent gain, load his mind with the guilt of undertaking this diſſection on the living body, without being ſure that he can perform it, nor without having often performed it on the dead ! nor am I leſs amazed to recollect that many

believe it poſſible to learn the operation, merely by obſerving how it is performed by others; they pretend indeed to no other authority for taking the knife and gorget in their hands, than having been often preſent when the operation was performed. Let thoſe infatuated men remember the following memorable facts:

The celebrated lithotomiſt *Raw* carried the ſecret of his operation with him to the grave; he operated, during his life on 3000 patients; his operations in hoſpitals and in the private chambers of the ſick were witneſſed by hundreds and thouſands. The ſurgeons, the phyſicians, the pupils, who were preſent at the public operations of Raw, and the ſtrangers who came from all countries to ſee him, were anxious to learn how he operated, but in vain! he foiled them in all their more ſubtile attempts, to diſcover what parts he cut, and to their direct inquiries his only anſwer was "legite Celſum." So little can the man who only ſees the outſide flouriſhes of an operator, know what he is doing with his knife or finger among the parts.

Dennis, who declares himſelf to have been the amanuenſis, the friend, the familiar companion of Raw, the perſon who accompanied him in his operations, and who alone had any ſhare of his confidence, acknowledges that he had endeavoured in vain to learn how the operation was performed, which Raw finally revealed to him on his death-bed.

Magna cum ſedulitate, quam continuus fere ipſi eſſem comes et amanuenſis, ſubtilitatem artis videndo didiceram adeo ut credidiſſem hiſce artis me factum peritum; ſed deceptus fuiſſem magnopere niſi clariſſimus vir ultimis ſui morbi horis velum ab oculis abſtuliſſet et myſteria vera artis revelaſſet. Fateor me ſaepe clariſſimum virum lithotomiam inſtituentem, opuſque nullo negotio perficientem vidiſſe, tumque cogitaſſe, me illam chirurgiam quoque ſuſcipere auſurum fore, ſed adfui quoque, ubi difficillime perficeretur, ſummam que ipſe artem et ſapientiam adhiberet, et nunquam me ſuſcepturum opus ſtatuebam. *Stupebam, et horrebam me vanæ huc uſque meæ opinioni plauſiſſe* cum audiſſem, quænam mihi adhuc defeciſſent, ſi prima fretus opinione in artis exercitio perrixiſſem. *Fateor ingenue me multos ægros infelices rediturum fuiſſe, et ſi unquam felices habuiſſem ſucceſſus id magis caſui, quam arti et ſcientiae fuiſſet tribuendum.*

"I had" ſays Dennis, "ſo often ſeen this illuſtrious man performing his operation with compoſure and eaſe, that I vainly ſaid within myſelf, ſurely I alſo can perform this operation; but when at other times I have ſeen him engaged in ſuch difficulties as required all his ſkill and wiſdom, I have vowed that I never

ſhould engage in any ſuch attempt. And when with his laſt breath he revealed to me the true method of performing the operation, I was ſtruck with remorſe and horror at my own vain thoughts: had I yielded to thoſe ſuggeſtions, many muſt have been the victims of my raſhneſs, and I could have been ſucceſsful only by chance."

Hear theſe confeſſions and tremble! let no man ever ſay again, "I can perform lithotomy, for I have ſeen it many times performed."

THE

OPERATION OF LITHOTOMY.

SECTION II.

Containing Biographical, Critical, and Hiſtorical, Sketches of the moſt famous Lithotomiſts, and of their Operations.

FIRST, OF THE APPARATUS MINOR, OR OPERATION OF CELSUS.

SUCH is the intereſt that men in all ages have taken in the ſucceſs of this operation, that the various methods in which it has been performed have been faithfully recorded.

The hiſtory which I am about to lay before my reader is, I believe, full of amuſement and inſtruction. Princes and parliaments have taken a direct concern in every thing that related to the improvement of lithotomy; and ſocieties and convocations of learned men have endeavoured to improve the operation, while individual phyſicians labouring under the tortures of the ſtone, have undertaken deliberate experiments and diſſections, and (looking forward to what they were themſelves to ſuffer) have taught bold but unſkilful men how to perform the operation with all the precautions which ſcience and the ſtudy of anatomy could ſuggeſt: even a ſlight ſketch of ſuch a hiſtory muſt be gratifying; but it is more, it is uſeful, it is eſſential to the young ſurgeon whoſe conceptions concerning this curious piece of diſſection, are not eaſily acquired! he muſt not only diſſect the parts but ſtudy the authors who have written on this operation. That ſurgeon ſurely would perform his operation with little confidence or courage (and it is one which

requires much of both) who were ignorant of the hiſtory of the operation which he is to perform; of the men learned or unlearned, by whom it was invented; of the ſurgeons rude or ſkilful in diſſections by whom it has been improved.

It is now ſuppoſed that the operation of lithotomy is reduced to ſuch perfect ſimplicity, that it may be as well performed by the ignorant as by the ſkilful: woe to him that truſts to this ſimplicity, this mechanical correctneſs. For if a thing ſo paradoxical were to be believed, we might burn our books, forſwear diſſections, and ſtudy merely a few plain rules for guiding the gorget along the ſtaff. Would this be teaching the operation of lithotomy? no, ſurely, men perform this ſimple operation with the gorget ill, chiefly becauſe they know no other! He will ſurely acquit himſelf beſt in driving the gorget into the bladder, who knows how to cut ſafely with the more ſimple apparatus of a knife and a ſtaff.

Before anatomy was ſtudied or more curious operations invented, men were cut for the ſtone, and, as might naturally be ſuppoſed, by a method very plain and ſimple. The ſtone in the earlier times of ſurgery was diſcovered, not by introducing a ſtaff, but by feeling it from the rectum with the fingers; and no ſooner was it remarked that the ſtone, the cauſe of ſuch excruciating tortures, could be diſcovered by the fingers and preſſed from within againſt the perinæum; than the idea naturally preſented itſelf of cutting the intermediate parts with a razor and extracting the ſtone with a hook. This operation, from the uſe made of the fingers in preſſing down and holding the ſtone, was named cutting by the Gripe, in contradiſtinction to the modern operation of cutting upon the ſtaff: and when in after ages, more complicated operations were invented and various inſtruments uſed, this was named the apparatus minor or leſſer apparatus, from its being performed with no other inſtruments than a knife and a hook.

This was the operation naturally reſorted to in early ages by a people not ſkilful in anatomy, nor fearful of future conſequences, and anxious only about extracting the ſtone; it has been all along the favoured operation of quacks, whoſe want of education excluded them from all knowledge of better operations, and whoſe chief ambition has been ſafely or unſafely to extract the ſtone. But it has alſo been the favourite operation of men the moſt eminent in our profeſſion, whoſe opinions claim reſpect, and who were not wanting in learning or ſkill, to compare this operation with others, and to do it every juſtice in the execution. Let me alſo confeſs that a predeliction for this ſimple and ancient method of operating, inclines me to deliver the hiſtory of it faithfully from the earlieſt times: Let it not be

regarded as any objection to this method that it is fit to be practised only in boys! for that is its chief excellence. In operating on a grown man, a voluntary sufferer, who resigns himself to the operation of lithotomy, although aware of all its dangers, in whom the parts being large, the incisions are made freely and the bladder presents itself fairly to the stroke of the gorget! we may with less reluctance and with less danger drive the gorget along the staff: but if, as I sincerely believe, this operation by the lesser apparatus can save us from the cruel necessity of driving the gorget with unrelenting hand among the viscera of a child, where the parts are small and the opening narrow; if this method of the apparatus minor be also a simple, easy, successful, unexceptionable, operation; if it have fallen into disuse merely through lapse of time, and the death of those who were used to perform it, and from the disrepute into which itinerate operators are now fallen, with whom it was the favourite operation! what I have to say in its favour must be deserving of the attention of professional men: Those who have seen the gorget driven with unrelenting and horrible violence into the narrow pelvis of a child, will read the history of the apparatus minor with no ordinary degree of pleasure.

Besides these names of apparatus minor and cutting upon the gripe, this particular method was distinguished by that of the Lithotomia Celsiana, from the elegant description given of it by *Celsus* who speaks of it in these terms: "Since I have, in describing the introduction of the catheter, mentioned the bladder of urine and the stone, the occasion seems to require that I should describe that operation, which, when all other methods fail, must be performed on those who are afflicted with the stone: an operation which, since it is full of danger, must never be rashly performed, nor at all times and seasons, nor in all ages, nor in all degrees of the malady! but only in the spring, in boys from nine to fourteen years of age, and where the disease is so desperate that it can neither be cured, nor even alleviated by medicine, but where the person must die in a little while. Therefore when it is resolved to try this only chance, let the body be prepared, for some days, by a due regimen, by moderate diet, by avoiding heavy meats, by drinking water alone; and during this term of preparation let the patient walk about, that the stone may descend towards the neck of the bladder, which will be known by introducing the fingers after the manner I shall presently mention in describing the operation: When thus assured that the stone has fallen down, the boy being made to fast for one day, the operation must be performed in a warm place according to the following rules."

" A ſtrong man accuſtomed with operations, being ſeated on a high chair, takes the boy in his arms, the boy's back inclining in a ſupine poſture upon the aſſiſtant's breaſt, his hips reſting upon the aſſiſtant's knees; his legs being then drawn up and his arms paſſed round his hams, the aſſiſtant takes hold of them and keeps the boy firm in this poſture. But where the lad is grown up and ſtrong, two men muſt ſit on two chairs ſide by ſide, the chairs and the thighs of the aſſiſtants where they touch each other being tied faſt together; when, the boy being ſeated on their two knees thus joined, each takes hold of the arm and leg next him, holding by the hand of the boy and pulling back his hams; and whether one or two aſſiſtants hold the boy, his ſhoulders muſt be ſteadily held down by leaning hard upon them with the breaſt. By this extenſion of the thighs the region of the pelvis is ſpread out without folds or wrinkles, while the bladder is ſo compreſſed as to make it eaſy to reach the ſtone; by the ſides of thoſe who immediately ſupport the boy, there are placed two ſtrong aſſiſtants, who ſteady them and keep them down to their ſeats." *

" Then the phyſician, having pared his nails carefully, inſinuates two fingers, the fore and mid fingers of the left hand gently, one after another, into the anus; ſpreading at the ſame moment the fingers of the left hand over the lower part of the abdomen, to prevent the neceſſity of hooking his fingers too rudely round the ſtone, by which the bladder might be injured. And this muſt by no means be raſhly done, as too frequent it is, but with all poſſible prudence, for a hurt of the bladder in that way may bring on convulſions and death: Firſt of all let the ſtone be ſought for at the neck of the bladder, where if it be diſcovered, it is more eaſily turned out through the wound; for unleſs the ſtone be thus diſtinctly known by its proper marks, the operation ſhould not be attempted. But if the ſtone either be not at the neck of the bladder, or have receded from it, the fingers muſt be puſhed deeper towards the bottom of the bladder, and the right hand alſo being carried behind the ſtone, muſt help to work it forwards; and when the ſtone

* " Medicus deinde, diligenter unguinibus circumciſis, atque ſiniſtra manu duos ejus digitos, indicem et medium, leviter prius unum deinde alterum in anum ejus demittit; dextræque digitos ſuper imum abdomen leviter imponit; *ne, ſi utrinque digiti circa calculum vehementer concurrerint, veſicam lædant.* Neque vero feſtinanter in hac re, ut in pleriſque, agendum eſt; ſed ita, ut quam maxime id tuto fiat. Nam læſa veſica nervorum diſtentiones cum periculo mortis excitat. Ac primum circa cervicem quæritur calculus; ibi repertus, minore negotio expellitur. Et ideo dixi, ne curandum quidem, niſi cum hoc indiciis ſuis cognitum eſt. Si vero aut ibi non fuit, aut receſſit retro, digiti ad ultimam veſicam dantur; paulatimque dextra quoque manus ejus

is within the gripe it muſt be the more cautiouſly and carefully handled in proportion as it is ſmall and ſmooth ; for a ſmall and ſmooth ſtone is apt to ſlip back, and to occaſion much handling and tormenting of the bladder. For theſe reaſons the fingers of the right hand are preſſed in behind the ſtone, while with the fingers of the left hand it is wrought downwards to the neck of the bladder. If the ſtone be oblong, let it be preſented, lying along with one end turned towards the wound ; if flat, with one edge towards the wound ; if ſquare, reſting upon two of its angles ; if bigger towards one end, let the ſmaller end be preſented to the wound. Whereas when the ſtone is round, there can, from the figure of the ſtone, be no difference in which poſture it is preſented ; but from its roughneſs there may ; if in a rough ſtone there be one ſmooth part, let that part come foremoſt."

" Matters being thus prepared, the inciſion is to be made through the ſkin down to the neck of the bladder, of a lunated form, not far from the anus, and with the horns of this lunated inciſion looking towards the hips. Then, in the deeper and narrower part of the wound, is to be made a ſecond inciſion, alſo tranſverſe, into the neck of the bladder itſelf, till the flowing out of the urine ſhows the inciſion to exceed in ſome degree the ſize of the ſtone : Thoſe, who for fear of fiſtulas (which the Greeks call Uriades) make their inciſion too ſmall, fall another way into the ſame or a greater danger ; for the ſtone, being thruſt ſtrongly forwards into the wound, muſt force an opening where it does not find one ſufficient for its exit, a thing eſpecially dangerous when the ſtone is rough or of an unfavourable form, for thence ariſe ſometimes hæmorhages or convulſions of the nerves, which although the patient may eſcape, yet the fiſtula muſt be much wider, when produced by laceration of the neck of the bladder, than by inciſion."

ultra tranſlata ſubſequitur. Atque, ubi repertus eſt calculus (qui neceſſe eſt in manus incidat) eo curioſius deducitur, quo minor læviorque eſt ; ne effugiat, id eſt, ne ſæpius agitanda veſica ſit. Ergo ultra calculum dextra ſemper manus ejus opponitur ; ſiniſtræ digiti eum compellunt deorſum, donec ad cervicem pervenitur. In quam, ſi oblongus eſt, ſic compellendus eſt, ut pronus : ſi planus, ſic, ut tranſverſus ſit : ſi quadratus, ut duobus angulis ſedeat : ſi altera parte plenior, ſic, ut prius ea, qua tenuior ſit, evadat. In rotundo nihil intereſſe, ex ipſa figura patet ; niſi, ſi lævior altera parte eſt, ut ea antecedat.

" Cum jam eo venit, incidi ſuper veſicæ cervicem, juxta anum cutis plaga lunata uſque ad cervicem veſicæ debeat, *cornibus ad coxas ſpectantibus paulum :* deinde ea parte, qua ſtrictior *ima* plaga eſt, etiamnum ſub cute, *altera tranſverſa plaga facienda eſt*, qua cervix aperiatur : *donec urinæ iter pateat ſic, ut plaga paulo major, quam calculus ſit.* Nam, qui metu fiſtulæ (quam illo loco ἐρειάδη, Græci vocant) parum patefaciunt, cum majore periculo eodem revolvuntur : quia calculus iter, cum vi promitur, facit, niſi accipit, idque etiam perniciofius eſt ; ſi figura quoque calculi, vel aſpritudo aliquid eo contulit. Ex quo et ſanguinis profuſio, et diſtentio nervorum fieri poteſt, *quæ ſi quis evaſit, multo tamen patentiorem fiſtulam habiturus eſt rupta cervicæ, quam habuiſſet,*

" The neck of the bladder being thus opened, the ſtone itſelf comes into view, which, if ſmall, is to be got out with the fingers alone, the fingers of the left hand puſhing it forward from within, while the fingers of the right hand help to pick it out: but if it be larger, a hook, made on purpoſe, muſt be ſlipped in behind it, the ſlender extremity of the hook ſhould be flattened and bent into a ſemicircular form, ſmooth on its back part, where it preſſes againſt the parts, and rough within where it touches the ſtone; and it ſhould be rather long, for a ſhorter hook has little power."

" When the hook is fixed behind the ſtone, it muſt be moved from ſide to ſide, to work the ſtone forwards; for the ſtone, if it be fairly catched by the hook, moves along with it: whereas, if you merely preſs upon the ſtone without moving it thus from ſide to ſide, it will ſlip, it will eſcape again into the bladder, and the point of the hook will ſtrike againſt the edges of the wound, the danger of which we have already explained. Having ſecured a fair hold of the ſtone, you are to perform, at one moment, three ſeveral motions, viz. from one ſide to the other and directly forwards, but all quietly, taking care firſt to draw the ſtone a little downwards. Finally, the handle of the hook muſt be raiſed, that the lower end may paſs deeper behind the ſtone which may then be more eaſily protruded. The ſtone, if it be not eaſily catched from above, may be extracted by ſlipping in the hook at one ſide."

——"Hæc eſt ſimpliciſſima curatio."—This then is the priſtine operation deſcribed by Celſus, with much ſimplicity and plainneſs; nor would I purſue his narrative one word farther than this natural cloſe, were it not to ſay, that Celſus in perfect conſiſtency with the above doctrine of the dangers ariſing from much violence or a narrow wound, orders the ſtone to be divided when too large to paſs without

inciſa. Cum vero patefacta eſt, in conſpectum calculus venit: in cujus corpore nullum diſcrimem eſt. Ipſe, ſi exiguus eſt, digitis ab altera parte propelli, ab altera protrahi poteſt. Si major, injiciendus a ſuperiore ei parte uncus eſt, ejus rei cauſa factus. Is eſt ad extremum tenuis, in ſemicirculi ſpeciem retuſæ latitudinis; ab exteriori parte lævis, qua corpori jungitur; ab interiori aſper, qua calculum attingit. Iſque longior potius eſſe debet: nam brevis extrahendi vim habet. *Ubi injectus eſt, in utrunque latus inclinandus eſt, ut appareat calculus, et teneatur, quia ſi apprehenſus eſt, ille ſimul inclinatur.* Ideoque eo minime opus eſt, ne, cum adduci uncus cœperit, calculus intus effugiat, hic in oram vulneris incidat, eamque convulneret. In qua re, quod periculum eſſet, jam ſupra propoſui. Ubi ſatis teneri calculum patet, eodem pene momento triplex motus adhibendus eſt: in utrunque latus; deinde extra, ſic tamen, ut leniter id fiat, paulumque primo calculus attrahatur: quo facto, attollendus uncus extremus eſt, uti intus magis maneat, faciliuſque illum producat. Quod ſi aliquando a ſuperiore parte calculus parum commode comprehendatur, a latere erit apprehendendus. Hæc eſt ſimpliciſſima curatio."

injuring the parts. He ſays, * "When at any time the ſtone is too large to be extracted without laceration of the neck of the bladder, it is to be broken; an operation certainly invented by Ammonius, whence he was named Lithotomus, or the Cutter of Stones. The operation is to be performed after the following manner: A hook is to be ſo inſinuated behind the ſtone as to reſiſt and prevent its recoiling into the bladder, even when ſtruck; then an iron inſtrument is uſed, of conſiderable thickneſs, but flattened towards the end, thin but blunt; which being placed againſt the ſtone and ſtruck on the farther end, cleaves it; care being taken at the ſame time that neither the fragments of the ſtone fall back into the bladder, nor the bladder itſelf be injured by the inſtruments."

COMMENTARY ON CELSUS.

This, being the earlieſt record now in exiſtence, deſerves our particular notice: it cannot indeed be in all points correct, ſince it is doubtful whether Celſus was a phyſician, or ever took any direct ſhare in the practice of our profeſſion; aſſuredly he was not a ſurgeon, and leaſt of all a lithotomiſt, for the operation of lithotomy was interdicted to all but thoſe whoſe peculiar profeſſion it was to perform it. Celſus knew the operation only as a part of the ſcience of medicine; he deſcribes it in ſuch terms as a ſpectator would naturally uſe, and he makes indeed a ſort of apology for deſcribing an operation ſo peculiar and ſo foreign to the general plan of his writings. † "But ſince I have, in deſcribing the introduction of the catheter, mentioned the bladder of urine and the ſtone, it is natural to deſcribe that operation which, when all other methods fail, muſt be had recourſe to by thoſe who are afflicted with the ſtone."

Many of his remarks on the ſeveral points of the operation, and all his directions

* "Si quando autem is major non videtur, niſi rupta cervice, extrahi poſſe, findendus eſt, cujus repertor Ammonius, ob id λιθοτόμος cognominatus eſt. In hoc modo fit. Uncus injicitur calculo ſic, ut facile eum concuſſum quoque teneat, ne is retro revolvatur: tum ferramentum adhibetur craſſitudinis modicæ, prima parte tenui, ſed retuſa, quod admotum calculum, et ex altera parte ictum, findit; magna cura habita, ne aut ipſam veſicam per ferramentum perveniat, aut calculi fractura ne quid incidat."

† "Cum veſicæ vero, calculique facta mentio ſit; locus ipſe exigere videtur, ut ſubjiciam, quæ curatio calculoſis, cum aliter ſuccurri non poteſt, adhibeatur."

concerning the after-treatment of the patient, bespeak him a most attentive and curious observer of whatever was done by the lithotomists. He allows the blood to flow freely during the operation, to lessen the risk of inflammation: He lays the patient on his back with the head low and the hips raised, covering the wound with cloths dipped in cool vinegar, and two hours after the operation, immerses him in a bath of hot water, which, as he lies supine, covers him all over from the knees to the navel; in this bath the patient was allowed to remain till he began to faint. The patient being then taken out of the bath was anointed with oil, and handfulls of plucked wool dipt in warm oil, were applied to the pelvis, and hips, and groins, and to the wound itself. Warm poultices he condemns as more injurious by their weight than useful by their heat, "plus pondere nocent quam calore proficiunt." Nor does he allow the slightest bandage to be applied. But what proves more particularly that Celsus was familiar with all that is usually done by lithotomists is, that he marks correctly the signs of extravasated blood, and directs how it is to be removed; for, * "If," says Celsus, "there is on the following day a difficulty of breathing, a retention of urine, and an intumescence of the lower part of the abdomen, it is plain that blood is coagulated in the cavity of the bladder; then the fingers are to be introduced, the bladder is to be gently handled, and whatever clots are there, being thus broken down, will be spontaneously discharged. If this fail, an injection of vinegar and water is to be thrown into the cavity of the bladder, which is another way of dissolving clots of blood."

These things could not have been reduced thus to system, unless the operation had been long known and daily practised; nor could they have been thus correctly detailed by Celsus, but from the information of professed lithotomists. It would be extraordinary indeed if a writer like Celsus were really ambiguous in all the most interesting passages of this description; this has been confidently affirmed, but I should ascribe the doubts among commentators, rather to their own subtility, than to the difficulties of the text; it is plain that they miscarried for want of knowledge! they imagined a classical education sufficient for the read-

* "Proximo die, si spiritus difficilius redditur, si urina non excedit, si locus circa pubem mature intumuit, scire licet, in vesica sanguinem concretum remansisse. Igitur, demissis eodem modo digitis, leniter pertractanda vesica est, et discutienda, si qua coierunt: quo fit, ut per vulnus postea procedant. Non alienum etiam est, oriculario clystere acetum nitro mixtum per plagam in vesicam compellere, nam sic quoque discutiuntur, si qua cruenta coierunt."

ing of Celſus! the tranſlators of Celſus have been phyſicians ignorant of ſurgery, and ignorant, of courſe, of the technical peculiarities of the language in which thoſe diſputed paſſages are written.

One expreſſion, the "plaga tranſverſa" has greatly perplexed tranſlators, though the ſenſe is very plain. The inciſion made by Celſus croſſed the centre of the perinæum, and was in all reſpects tranſverſe with regard to the bladder as well as to the external parts: "A lunated inciſion is to be made down to the neck of the bladder, with the horns looking towards the hips; and there, in the deepeſt and narroweſt part of the wound, is to be made a ſecond tranſverſe inciſion into the neck of the bladder itſelf." The inciſion of Celſus then was lunated and could not be at once lunated and longitudinal. Secondly, the horns of this lunated inciſion pointed to two correſponding parts, call them the two hips, or the two thighs, which you pleaſe; now had the inciſion not been, in every ſenſe of the word, tranſverſe, its horns could not have pointed to the two correſponding parts, but to the pubis and anus.

Thirdly, The deep inciſion is deſcribed in theſe words: "Altera tranſverſa plaga," a ſecond tranſverſe wound, which expreſsly implies, that this ſecond wound is to be a tranverſe wound, and theſe words are at the ſame time as definite and relative a deſcription of the firſt as of the ſecond wound. Fourthly, the ſame preciſe expreſſions are uſed by Celſus in deſcribing the operation on women: "For women," ſays Celſus, "on account of the ſhortneſs and wideneſs of their urethra, paſs the ſmaller ſtones; yet, when the ſtone is large, the ſame inciſions are required as in men. In virgins the fingers are to be introduced into the rectum, as in boys, for the purpoſe of holding down the ſtone; but in married women the fingers are to be paſſed into the vagina: in virgins the inciſion is to be made on the left ſide of the labium, in married women it is to be made betwixt the meatus urinarius and the os pubis; *in both, the inciſion is to be tranſverſe*, nor is there any reaſon to be alarmed, although, in women, there ſhould be a profuſe hæmorrhage."

The inciſion in women, as in men, was made on the perineum. "Tum virgini quidem, ſub ima ſiniſteriore ora, mulieri vero inter urinæ iter et os pubis, incidendum eſt, ſic ut utroque loco plaga tranſverſa ſit." Both in virgins and in married women the inciſion was tranſverſe, and the variation in the preciſe place of the wound was obviouſly regulated by the ſtate of the parts;

in virgins it was below the vagina, becaufe of the vagina being as yet undilated, but it was within the vagina in married women, betwixt the urethra and the pubis *.

There is one paffage of Celfus which might have ferved as a leffon for all fucceeding ages, and as an authority (for they have proceeded folely upon authority) for making thofe free incifions on which the fate of the patient fo much depends. "Thofe who for fear of fiftulas *make their incifions too fmall*, fall another way into the fame or a greater danger, for the ftone, being thruft ftrongly forwards into the wound, muft force that degree of opening which it does not find; and this is efpecially dangerous when the ftone is rough or of an unfavourable form, for thence arife, fometimes hæmorrhages, fometimes convulfions of the nerves, which even although the patient fhould efcape, yet there is greater danger from *laceration than from incifion*." The words of Celfus are indeed very memorable; and though in the dead, as in the living languages, the quaintnefs of the antithefis is not always to be received as a proof that the maxim is found; although in modelling the fentence into this alliterative form, the fenfe is exaggerated and truth and correctnefs facrificed to found; yet in fcience, as in morals, there are certain important axioms which fhould be thus enforced; for the moft pofitive affirmation, or the moft logical proof, could not give to any important maxim fo ftrong a hold of the reafon and memory as the correct oppofition of two fimple words. It is therefore much to be lamented that this particular maxim has not been remembered in the very words of Celfus: "Multo tamen patentiorem fiftulam habiturus *eft rupta cervice quam incifa*."

And I hope that my reminding the profeffion of this old and well proved maxim will prevent, in future, thofe long and murderous operations, where the furgeon labours for an hour in extracting the ftone, to the inevitable deftruction of the patient.

* "*De Calculis fœminarum.*

"Hæ vero curationes in fœminis quoque fimiles funt; de quibus parum, proprie tamen quædam dicenda funt. Siquidem in his, ubi parvulus calculus eft, fcalpellus fupervacuus eft; quia is urinam in cervicem non compellit, quæ et brevior, quam in maribus, et laxior eft. Ergo et per fe fæpe excidit, et, fi in primo, quod eft anguftius, inhæret, eodem tamen unco fine ulla noxa educitur. At in majoribus calculis neceffaria eadem curatio eft. Sed virgini fubjici digiti tanquam mafculo, mulieri per naturalia ejus debent. Tum, virgini quidem, fub ima finifteriore ora: mulieri vero, inter urinæ iter et os pubis, incidendum eft fic, ut utroque loco plaga tranfverfa fit, neque terreri convenit, fi plus ex muliebri corpore fanguinis profluit."

Science, like hiſtory, has its fabulous and dark ages, in which things atchieved by the moſt ſimple means ſeem wonderful, and arts at one period generally known, ſometimes fall into oblivion! ſo it was in regard to this operation, which, after being performed by Meges and Ammonius, (near the times of Hippocrates,) and deſcribed as a ſpectator by Celſus, came at laſt to be entirely neglected and forgotten by men of ſcience, and to be practiſed only by quacks. The diſtance indeed is never great betwixt that period in which men, under the title of Lithotomiſts, Herniary ſurgeons, or other titles, claim certain operations as peculiarly their own, and quackery, or thoſe arts and deceptions by which ſuch claims are maintained. During many centuries, quacks were, in regard to hernia, fiſtula, and various diſeaſes, the chief operators, and they were the only lithotomiſts. Though ſuch operators were contemned by the learned, they were the idols of the vulgar; many among them operated to admiration, and one eſpecially had the honour of attracting, in a peculiar manner, the malignity of the profeſſion.

This was Le Raoues, a lithotomiſt, who operated about a hundred years ago in the principal cities in the ſouth of France. He practiſed a method not expreſsly known to Van Horne, who only mentions the wonders this man was reported to perform, as an incitement to others to diſcover and practiſe his way of cutting for the ſtone.

"I muſt not in this place neglect," ſays Van Horne, "to mention what was reported to me ſix months ago, by a nobleman, who had not only witneſſed in others, but experienced in his own perſon, the happy talents of one Raoues, a lithotomiſt, of Niſmes in France, who cuts men of all ages with ſingular addreſs, without the uſual ligatures, without other apparatus than a knife and hook, placing the patient merely on the knees of his aſſiſtant. For he is very ſkilful in catching the ſtone with his fingers, and preſſing it ſo againſt the perinæum, that, upon making a ſlight inciſion, the ſtone ſtarts out of its own accord: nor is this all, for after the inciſion there is no hæmorrhagy, nor does there paſs even one drop of urine by the wound: which is eaſily explained; for the inciſions of the ſkin, and of the internal wound, do not correſpond; and, incredible as it may appear, the parts are healed in five or ſix days; ſo that on the ninth day this nobleman walked round the city with his operator. Satisfied of this fact, not by report, but by being in a manner a ſpectator of what was performed on this nobleman, I hold it

right to relate the whole, that it may incite others to learn and practiſe this method *."

The beſt and moſt learned men of that age have ſpoken with enthuſiaſm of the operations of Le Raoues. Roonhuyſen, in his Caſes, tranſlated into Engliſh in the year 1676, ſpeaks of this operator in the following terms: "At this very time we underſtand, both by letters and from patients, ſomething very conſiderable touching a new contrivance *of cutting the ſtone*, practiſed in *France*, at *Bourdeaux*, by a lithotomiſt called *Raoues de Chaſtres*, now dwelling at *Niſmes*, uſed both upon old and young, and that after a quite other manner than hath been practiſed hitherto. For after that the patient hath been ſounded and felt by the artiſt, after his own way, without any body's being preſent, he then, together with the patient, walks for half an hour in his chamber, and then puts him in his ſervant's lap, who holds the patient's legs without tying him, and the maſter uſeth no other inſtrument but a little crooked knife, and no bands; nor doth he uſe any force in preſſing the belly, in lifting it up or the like, thereby to get the ſtone between his fingers. It is alſo done with leſs trouble and danger, without as much as obſerving the ſeaſon of the year, the temperament of the patient, or his age. He only thruſts two fingers into his fundament, ſo as to get the ſtone; which having compaſſed with little pain, he conveys it to the *os iſchium* as far as he can, and then a little higher, making an inciſion with his little crooked knife, of the uſual bigneſs, but ſomewhat higher and obliquely, beginning from the ſide of the ſaid *os iſchium*, and ſo continuing to the *perinæum*; which inciſion or opening is more (in that place) according to the grain of the fibres, as will be found if viewed attentively. Now

* Non debeo hic reticere, ante ſemi-annum circiter narratum mihi fuiſſe à generoſo viro, qui ipſe in aliis viderat, et in ſemetipſo expertus erat felicitatem operatoris Nemauſenſis Galli, nomine Raoues, qui ſingulari dexteritate cujuſcunque ætatis homines ſecat quàm facillime et à calculo liberat, citra inſtitutam ægri ligaturam, ſolummodo eum imponendo genubus ſui famuli, aut citra ullam inſtrumentorum opem, niſi ſolius cultri ſive novaculæ. Nam callet exacte modum, miniſterio digitorum, etiam in adultis, calculum attingere et ad perinæum ita propellere, ut facta levi inciſione, calculus ipſe ſponte ſua proſiliat: neque hoc ſolum, ſed, peracta jam ſectione, nullus ſanguinis fluxus, nihil urinæ, per vulnus exit, cujus hæc ratio eſt quia labia vulneris cuta carnis & veſicæ, adamuſſim ſibi non reſpondent: imò, quod fidem omnem ſuperat, quinque aut ſex dierum ſpatio vulnus conſolidatur, *ut nono die ipſe generoſus urbem cum ſuo lithotomo circumambulaverit. Quod non auritus tantum teſtis, ſed penè oculatus in illo viro, qui in ſemetipſo perpeſſus erat hanc operationem, refero, ut alios excitem ad indagandum atque tentandum hunc modum,* cum videant humanam induſtriam eò jam perveniſſe, quo negant hactenus ab ullo mortalium perventum eſſe.

a ſmall inciſion made according to the grain of the fibres will yield much more, and can, by laceration, be ſomewhat widened if it have been made too little (for the wound that is to be made in cutting the ſtone is better a little too ſmall than too great); and by this means, with his fingers he eaſily draws out the ſtone without the uſe of any other inſtrument, and after having cleanſed the wound, he conveys and thruſts back the bladder to its place, whence it had prevented alſo the droppings of the urine, by dreſſing the patient with an ordinary band, *who in ſeven or eight days is poſitively cured.* I have alſo read a printed letter, intitled La nouvelle Maniere de tailler la Pierre; i. e. *The new Manner of cutting the Stone;* wherein it is affirmed, that then this maſter had already cut, after this way, above fifty perſons, of twenty, thirty, forty, fifty, and ſixty, years of age, with ſo good ſucceſs, that not one of them all had died, yea, that very few or none of them had had ſo much as a fever. Thus you ſee, that art is more and more improved by continual diſcoveries, for which we ought to praiſe Almighty God, vouchſafing ſuch and the like new remedies to the benefit of mankind."

But the phyſicians of Paris could by no means regard the appearance of La Raoues as the ſign and working of God's Providence in behalf of mankind. They purſued him with their utmoſt malice, and prevailed, at laſt, on the learned Drelincurtius to come forth the fool of the pantomime, the ——— of their plot. They ſet him the taſk of repreſenting this innocent man in the moſt ludicrous and moſt deteſtable point of view: they called *Le Raoues* a new ſaint, and required Drelincourt to write the legend of his miraculous cures in terms of deriſion, and to alarm all France with relations from which modeſty and decency muſt revolt.

"The head and front of his offending" was only this: that having operated with ſingular ſucceſs in the towns and provinces of France, he ventured at laſt to appear in Paris, and had the audacity there to obtrude himſelf (in the houſe of Bourdelot the King's phyſician) into a ſociety of learned men; where, in the preſence of His Highneſs the Prince of Condé, he vaunted of a diſcovery, which he ſaid he had diſcovered four years before, of cutting for the ſtone by a new operation, more expeditious, ſafe, and eaſy, than that of the great apparatus then in uſe.

This operation Drelincourt proceeds to deſcribe in the following terms: "He operates like all other quacks, by cutting upon the gripe; he feels for the ſtone with his fingers in the rectum, makes the patient, before operating, walk a turn or two through the room to bring the ſtone to the neck of the bladder; he places him

in the lap of a ſtrong aſſiſtant, who, joining his hands over the patient's belly, preſſes, with the help of compreſſes, upon the epigaſtric region; when he is about to cut, he introduces his fingers very high in the rectum, and ſeizes and fixes the ſtone with equal eaſe in boys and in grown men. I was aſtoniſhed," ſays Drelincourt, "when I ſaw what muſt have ſeemed incredible had it been only reported to me: he introduced not two fingers into the rectum, but three, and paſſed them till his hand was ſtopped by the thick fleſh of the muſcles of the thumb, in a manner which I never could have conceived, but I have ſeen it, and have ſeen it with horror. (C'eſt un fait que je ne pouvoit m'imaginer; mais j'en ay été témoine oculaire, et j'en ay eu de l'horreur.) Holding his victim thus impaled, he curved the points of his fingers very ſtrongly, preſſing the coats of the rectum violently towards the bladder; and through the coats of the bladder, and the three coats of the rectum, does this operator diſcover not only a ſtone, but any number of ſtones, their ſize, ſmoothneſs, roughneſs, ſoftneſs, hardneſs, weight, and colour even.—Then catching the ſtone betwixt his fingers, placing it in a favourable direction, and preſſing it down towards the tuber-iſchii, he at once preſſes down the ſtone with the fingers, and extends the ſkin over the perineum (by drawing it towards the right ſide) with the thumb of his left hand, and taking in his right the knife or razor, which till then he holds in his mouth, he cuts upon the ſtone with a ſort of lunated inciſion, the horns of which look towards the left hip: he then cuts deeper, dividing through the erector muſcle of the left ſide, cutting an inch above the anus, and nearly an inch to the left of the rapha perinæi. The inciſion is continued till the knife grates upon the ſtone; then preſſing the bladder at once with both hands, with the right above the pubis, and with the left from within the rectum, the ſtone leaps out into his breaſt or ſhirt collar, or if it do not, is picked out with the fore-finger. Thus does he extract the ſtone from the biggeſt and fatteſt perſon with eaſe."

"Now forſaking" ſays Drelincourt, "his hold of the bladder within, and of the ſkin without, he allows the parts to be retracted, by their natural elaſticity, different ways; the bladder returning to its natural place, recedes towards the right; the ſkin of the perinæum is retracted towards the thigh, i. e. towards the left; and the wound is ſo cloſed that the urine immediately paſſes the natural way."

"The patient, after getting up, making a few ſteps and ſtrides about the room," ſays Drelincourt, "to clear the bladder, or ſhaking himſelf, or jumping over his garter, is laid in bed; and this Jack-pudding of a Charlatan plaſters up his bottom with a

paſte of flour and eggs; and keeping a mountain of flour over the wound, thus bandages his poſteriors."

Although Le Raoues had cut hundreds for the ſtone in Rouen, Bourdeaux, Niſmes, and other cities, it was boldly affirmed that he had cut thoſe only who had not the ſtone: it was thus that his rivals thought fit to explain the miracles he ſeemed to perform.

This tale is told by Collot, his moſt invidious rival, in very plain terms: "Le Raoues," ſays Collot, "having operated on many in Bourdeaux, who had not the ſtone, received the thouſand piſtoles which theſe operations produced him, and made his eſcape: he ſoon after arrived in Paris, where being more narrowly watched, he was detected in his arts and practices: he was obſerved to make an inciſion in the hip, too ſuperficial even to reach the bladder or internal parts, much leſs to cut through them; and the ſtone produced by this operator was one which he held in his ſleeve, dropt into the palm of his hand at a fit period of the operation, and preſented to the ſpectators, ſoiled with the blood of the wound: nay the enemies of Raoues affirmed, that ſome of thoſe who died by accident after theſe ſuperficial inciſions, were found, (upon opening their bodies,) to have in the bladder, many ſtones, without the ſlighteſt ſcar or mark of the inciſion having ever reached that part.—"One day," ſays Collot, "while Le Raoues was cutting a boy for the ſtone, the ſervant was detected in the act of ſlipping a ſtone into the maſter's hand; who, for fear of a proſecution, withdrew himſelf from Paris, and was never heard of more. Theſe," ſays Collot, "were the tricks by which he had raiſed a momentary reputation in the provincial towns; and theſe were the ſort of operations he had performed with ſuch applauſe at Bourdeaux."—"Il eſt vrai qu'il en tailla pluſieurs a Bourdeaux; cependant on ne fut que trop perſuadé dans la ſuite qu'il *n'y avoit pas un ſeul de ſes malades auquel il n'eut ſuppoſé la Pierre.* Collot, ſur la Pierre."

This is a tale founded in malice, and hardly deſerving of refutation: Le Raoues was in poſſeſſion of a plain, ſimple, ſucceſsful operation, which he well knew how to perform, and had as little need as Collot himſelf to reſort to artifice. But it was the practice of the ſurgeons and lithotomiſts of Paris, the moment they found their province invaded, to fabricate the moſt ſcandalous falſehoods. Collot was the King's lithotomiſt, and his family continued ſo for many generations; he could not but feel jealous and indignant at this low and ignorant man aſſuming the title of lithotomiſt. Le Raoues muſt, from every circumſtance in his ſituation, have had many enemies,

and it is ſurely more natural to believe that cunning and intereſted men contrived theſe tales, than that even the moſt unprincipled wretch could dare actually to commit ſuch cruelties: ſo atrocious is the crime alleged againſt Le Raoues, that he muſt be acquitted! If he did indeed perſuade the people to ſubmit by ſcores to the operation, without having ſuffered the torments of the diſeaſe, and perſuaded the ſpectators that they ſaw him extract the ſtone, he muſt, with all the addreſs of an empyric, have had "a tongue that could wheedle the devil!"

But he was belied: his operation, even as deſcribed by his enemy Drelincurtius, is ſuperior to any practiſed by the family of Collot. The Collots traduced him, and accuſed him of making inciſions when he had no intention of cutting for the ſtone! but full ſorely did this ſame family of the Collots ſuffer in their turn: they were accuſed by others of the ſame crime: "even-handed Juſtice was in this moſt juſt, commending th' ingredients of their poiſoned chalice to their own lips." Collot, the father, was himſelf afflicted with the ſtone, and the operation was performed by his ſon! This was a painful and terrible act of duty and obedience! what was the young man's reward? what ſaid the rivals of this family?—That it was a mock operation, well concerted betwixt the father and the ſon, as if Collot could not bring his ſon into the world by any device, but by being at the ſame time delivered of a ſtone *! Yet ſo much did this villanous report prevail, that the editor of Collot defends him from the accuſation. "Des eſprits ſoupçonneux ont cru qu'il n'avoit voulu donner qu'un example de confiance; mais des témoines oculaires m'ont confirmé qu'il avoit la Pierre." Such were the arts in uſe in this abandoned city; which a man, ſo meritorious as Le Raoues, and ſo unſupported, could not eſcape, could not withſtand.

After many other contemptible inventions for bringing this man into diſrepute, Drelincourt had the meanneſs to alarm the people of France about the pollution of their women, in terms incredibly low and abominable. "Digitos ſuos ſalaces et improbos in ſinum pudoris laſcive et nequiter adigit ſique in nubæ criſtas terit; ipſa virginalia clauſtra rumpit. Pudibundone quippe et anilliſſimum pudicitiæ ocellum vix hiſcentem illiberaliter et proterve legit atque decerpit. Imò cum ſinat licet, en rubentem ejus gemmantemque calycem amiciſſime gemmarum connexu conjunctiſſimum necdum hiantem præmature explicat et diffundit."

This is horrible, and altogether abominable! it is addreſſed plainly to fanatics,

* The family of the Collots operated with the apparatus major, which is next to be explained.

priefts, and partifans; and, through an affected modefty, it is (though in a French book) written in Latin, that it might be conftrued to every curious dame, by her confeffor and domeftic prieft, with fuch comments as the text might require. Thus did the learned Drelincurtius fet himfelf to the degrading tafk affigned him, with that fervour of malice "which outruns the paufer reafon," and bartered away his academic honours for a cap and bells.

COMMENT ON THE OPERATION OF LE RAOUES.

Let us candidly, and for the fake of fcience, reflect on the nature of this operation, and condefcend to receive one leffon more from a clafs of men who have already given us many that are very memorable. Every thing in this operation, that is thus condemned by Drelincurtius, is peculiarly commendable; his criticifms are moft erudile, but moft unfkilful, fo that we may venture to pronounce this man, "with all his learning, to have been the moft ignorant man in Europe." His raillery could not but be mifplaced, fince he criticifed what he could not underftand. He was not aware that this was an operation to be improved, not by learning, but by practice! the operation had indeed been improvd, by thofe itinerant lithotomifts, to that degree of excellency, that we may fubfcribe with confidence to the rules and practices of Le Raoues.

Le Raoues is accufed of making his patient walk round the room to bring down the ftone to the neck of the bladder. What fays Celfus to this practice? "Ambulandi vero inter hæc exercitatione utatur quo magis calculus ad veficæ cervicem defcendat." This is the fame rule delivered in language which Drelincurtius would not have ventured to difpute.

The practice of bringing down the ftone to the neck of the bladder had been in ufe, wherever the operation by the apparatus minor had been performed. Parée particularly recommends the practice. The grave and learned Roman makes the patient perambulate the chamber: the merry Frenchman makes him dance till it falls down: "Ayant dont fuppofé que nous avons un jeune enfant à incifer, il faut premierement que le chirurgien le faffe fauter cinque ou fix fois à fin de faire defcendre la Pierre au fond de la veffie." But Van Horne is ftill more amufing, and requires, I think, too much agility and fpirit on the part of his pa-

tient: he makes him, after dancing a while, leap from the highest stools in the house. "Jubemus ægrum aliquoties subsilire, *aut bis terve de scamno aliquo desilire ut* calculus deorsum prolabatur ad collum vesicæ."

Le Raoues was next accused of "pretending to feel through the coats of the bladder, and through the three coats of the rectum, the size, smoothness, roughness, softness, hardness, weight, and colour, of the stone." What says the text of the classical Celsus to this point? Celsus certainly instructs the operator how to recognize a rough, a smooth, an oblong, or flattened stone, and how to present it so to the perinæum, as to pass through the wound in the most favourable way. Celsus indeed presumes every thing to be distinguishable through those same coats of the rectum, except the colour of the stone; and the colour of the stone, though it was of no importance in the opinion of Le Raoues, was of singular importance in the opinion of Drelincurtius, since it enabled him to represent Le Raoues in terms of ridicule.

Le Raoues was accused too, of thrusting more than two fingers, of driving almost the whole hand into the rectum, in a manner which struck Drelincourt with horror: but what avail the horrors of a man ignorant in surgery, and unaccustomed with operations? The horrors of Drelincurtius are of no more importance than the tremor of a woman or a child at the sight of blood. Every person who stands as a mere spectator to witness the unavoidable pangs of an operation, must have acute feelings; but if he do not understand what is useful and what is hurtful in that operation, his feelings must be but prejudices of little account. Drelincurtius never thus handled a stone to estimate its form or size, while Le Raoues had searched thousands, without the help of the catheter. The distinctness with which the stone is felt with the finger, must have appeared incredible to a physician; even to surgeons I am sorry to think how little this sensation is familiar. Surgeons introduce the staff because they are to cut upon it; but they are indifferent about feeling, with the fingers the actual size of the stone. They make their incision without being able to ascertain whether it be proportioned to the size of the stone. Now this is strange! a surgeon would not choose to open an abscess of the neck, or of the perinæum, without wishing to know whether such abscess opened into the throat, or urethra, or rectum? yet the surgeon who examines a slight abscess carefully, and opens it with circumspection, plunges his gorget into the bladder, without condescending previously to put his finger into the rectum; he trusts to the clicking of his staff, and is indifferent about the size, if he be only sure of the existence

of a ſtone. That Le Raoues was forced to grope hard for the ſtone was the inevitable conſequence of his venturing to do what regular ſurgeons have ſeldom done, for they in operating with the apparatus minor have cut boys only, while Le Raoues cut men of thirty, fifty, and ſeventy years of age. 2d. Had Drelincourt attended to thoſe leſſons which Le Raoues offered freely to every ſurgeon, he might have been taught by him, that to feel the ſtone diſtinctly and reach it fairly in the adult, and to hold it firm even in a younger ſubject, both ſkill and boldneſs, and the introduction of more than two fingers are required.

It ſtands then upon record, that Le Raoues was particularly careful to aſcertain the ſize of the ſtone, for which purpoſe he carried the patient into a private room, and there, alone, or with his ſervant, examined by the rectum; that when he brought him out for public operation, he ſhowed particular addreſs and boldneſs in catching the ſtone under his fingers, preſſing it firmly againſt the perinæum, and making it even leap out into the collar of his ſhirt as ſoon as the inciſion was performed; that before he made his inciſion, he drew the ſkin powerfully to the right ſide, and holding it ſo with his thumb, while he performed the inciſion, allowed it then to be retracted ſo as to cover the deeper wound; and that he moreover endeavoured to enſure a perfect adheſion, by cloſing the wound nicely with flour mixed up with the white of eggs. When I obſerve all theſe wiſe and rational precautions, I am fully perſuaded that this operation had been gradually attaining to great perfection in the hands of practical men, who were ſo far rude and ignorant as to know no other; and can eaſily believe what the admirers of this Le Raoues affirmed, that he was ſometimes able to carry his patients abroad in not many days *.

Drelincourt had the misfortune to criticiſe ſteps in the operation which he could not comprehend; and the confidence with which he expoſes what he thinks errors on the part of Le Raoues, may ſerve as a warning to men whoſe propenſities lie

* This is a fact reported indifferently by the friends and by the enemies of Le Raoues. Mingelouzeau reports that by his management of the parts by drawing aſide the ſkin with the thumb of the left hand, while he cut with the right; by allowing it to be retracted after the extraction of the ſtone, his patient immediately paſſed the urine the natural way; nor can we wonder at this ſince the ſame happens in our deep and direct inciſion. He alſo informs us that Le Raoues cut the neck of the bladder at the ſame time with the integuments. He ſays that while Le Raoues cut boys only, he ſucceeded, but when he ventured to perform this operation on adults, he was leſs fortunate. "Et il ſe trouvoit que la playe du col de la veſſie ne repondoit plus à la playe des intéguments, mais en étoit couvert; *et le malade ne rendoit point ſon urine par la playe qui ſe renfermoit* très facilement." In the city of Bourdeaux alone (ſays Mingelouzeau) he cut eighty-two perſons of various ages for the ſtone.

this way, who think themſelves men of wit and merriment, and regard ridicule as the teſt of truth. It is not from caprice that I approve what others have choſen to condemn, but from a ſerious conviction that theſe are the beſt rules and practices hitherto laid down! I declare that I ſhould rather take for my maſter the contemned Le Raoues, than the celebrated Aulus Cornelius Celſus.

ANATOMICAL ANALYSIS OF THE APPARATUS MINOR.

But this operation gradually improving in the hands of practical men, inſenſibly attained to a degree of perfection not yet remarked, and which conſiſted not merely in the dexterity with which the ſtone was graſped and held down, nor in the proviſions for a ſpeedy reunion of the wound, but in the direction and form of the wound itſelf. The inciſion for lithotomy was, from the time of Hippocrates, Ammonius, and Meges, down to the days of Celſus, tranſverſe and lunated; it croſſed the perinæum near the anus, and it was ſtill of a lunated form in the time of Le Raoues, who made, according to the deſcription of Drelincurtius, "a lunated inciſion nearly an inch to the left of the rapha perinæi, and with horns looking towards the left hip: this man, in ſhort, cut in a ſort of ſemicircle round the tuber iſchii. At ſome period of which we have no diſtinct record, but probably near the time of Le Raoues, lithotomiſts changed this lunated for a longitudinal inciſion. Frere Jaques had two operations, the one, viz. that by the apparatus minor, in which he cut upon the ſtone; the other peculiar to himſelf in which he cut upon the ſtaff. Perhaps he learnt his operation by the apparatus minor, from Le Raoues, in performing the inciſion he would naturally carry his knife longitudinally and in the ſame direction that he did in cutting upon the ſtaff, which was his own peculiar operation.

"Having aſſiſted," ſays Mery, "at all the operations of Frere Jaques, in the Hotel Dieu, I have had occaſion to obſerve his way of operating with the apparatus minor on little boys: Paſſing the fore and midfingers of the left hand into the rectum, and laying the left upon the pubis, he grapples the bladder, and forces down the ſtone till it preſents, in boys, in the perinæum, and in women, betwixt the vagina and pubis; and holding the ſtone firm with his left hand, he cuts with his right, making his inciſion from the tuberoſity of the iſchium towards the ſtone,

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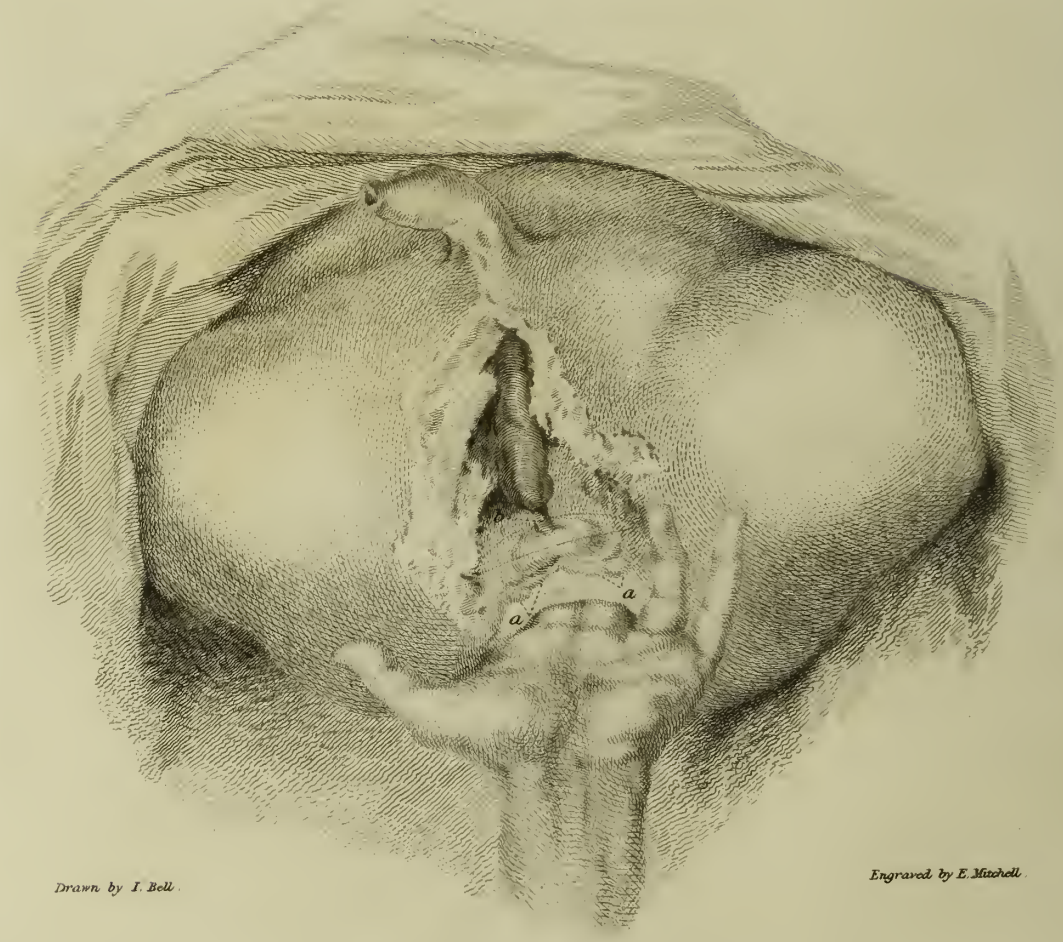

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ſo that betwixt his two operations, that by the leſſer, and that by the greater apparatus there is not the ſlighteſt difference with reſpect to the inciſion." Thus it came to paſs, at what period we do not expreſsly know, that the inciſion by the leſſer apparatus was approximated to that by the greater apparatus; the inciſion performed by the itinerant operators of the ſixteenth century, with that performed in modern times by Raw, Cheſſelden, and the ſurgeons of the preſent day; for ſince the inciſion was in the ſame place in the ſame direction, dividing the ſame parts, it made no eſſential diſtinction whether it was performed, as among theſe itinerant operators, by cutting upon the ſtone, or as by modern lithotomiſts, by cutting upon the ſtaff.

To underſtand how eſſential an innovation this was, we muſt apply to the preſent as to every other innovation, the teſt of anatomy.

Firſt, It will be obvious that the operation of the ancients is full of danger, for the parts cut muſt vary according to the degree in which they are protruded by the fingers; it is, no doubt, poſſible to perform the operation ſafely, for the parts may be protruded by the finger in the anus, (as in the plan, page 60,) in ſuch a degree that the lunated inciſion ſhall divide the neck of the bladder, and cut through the proſtate gland, without injuring the veſiculæ (a a) or the urethra (b). Secondly, It is obvious that if the parts be in any particular ſubject larger, or (in conſequence of the peculiar manner of the operator) more protruded, the inciſion will not be in the ſubſtance of the gland, nor ſtrictly in the neck of the bladder, but behind the gland and acroſs the two veſiculæ where they enter under the gland. Thirdly, it is manifeſt, that if the parts were leſs ſtrongly preſſed upon, the neck of the bladder and proſtate gland would not be at all protruded, the inciſion would paſs through the anterior part of the gland; and then the membranous or naked part (b) of the urethra where it turns round under the pubis being interpoſed, would be cut off from the bladder, and if the patient ſurvived the operation, he would labour under an incurable fiſtula. Such are the manifeſt dangers of this operation deſcribed by Celſus. Fourthly, it was plainly the chief advantage of the lateral inciſion (i. e. of the inciſion on one ſide of the perineum,) as practiſed in the time of Le Raoues and Frere Jaques, that it obviated this danger; in this lateral inciſion the urethra eſcaped, and thence Le Raoues, Hieſter, and others, who favoured this operation, practiſed it with a degree of ſucceſs and ſafety, though, no doubt, among their patients alſo many died, and ſome had fiſtulas. But it muſt occur to any one who reflects on the poſture in which the

parts are held on the points of the fingers, that the ſlighteſt degree of obliquity in the wound, the ſlighteſt deviation of the inciſion from its due place, the ſlighteſt prolongation of the upper horn of that lunated inciſion, (whether it has its horns turned towards the right or towards the left hip) would ſever the urethra from the bladder.

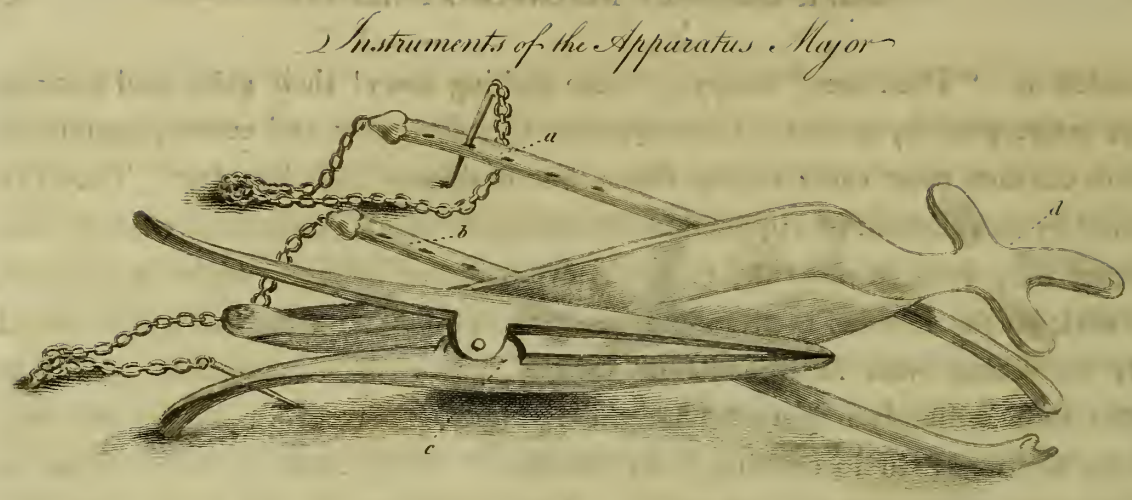
Nor is this at all an imaginary danger: "On the 20th of May," ſays Mery, "I performed, in preſence of Frere Jaques himſelf, accompanied by the ſurgeons and phyſicians of the hoſpital, the diſſection of ſix boys cut by him for the ſtone; and in all the ſix we found the *bladder ſeparated from the urethra where it enters the penis*, and the blood veſſels of the penis torn acroſs or divided by the knife. And, on the 2d of June, I diſſected the body of a boy thirteen years of age, cut by Frere Jaques, by the gripe, in whom we found the bladder ſeparated from the penis and from the pubis, the arteries and veins cut acroſs, and the hæmorhoidal veins alſo divided." Theſe are fatal proofs of the ill effects of ſuch irregular inciſions, and ſerious examples of an excellent operation being ill performed. But all theſe dangers are obviated at once, by introducing the ſtaff into the bladder, for that prevents a poſſibility of our cutting off the urethra, and not to cut into the neck of the bladder when cutting thus upon the ſtone itſelf, is impoſſible. In this way my brother, Mr. Charles Bell, has performed the operation rapidly and ſucceſsfully.

In operating by this leſſer apparatus, you cut upon the ſtone, and cut of courſe, with perfect ſecurity, an inciſion exactly proportioned to its ſize. There is no difficult nor dangerous diſſection; no gorget, nor other dangerous inſtrument, thruſt into the bladder, with the riſk of its paſſing in betwixt that and the rectum; you are performing expreſsly the lateral inciſion of Raw and Cheſſelden, in the moſt ſimple and favourable way; and, indeed, Raw himſelf, though he declined telling how he operated, always had the honeſty to refer the enquirer to Celſus—"Legite Celſum" was always his reply. But what makes the deepeſt impreſſion on my mind in favour of the apparatus minor is, that we are, by this operation, ſaved from the horror of plunging a gorget, blindfold, among the viſcera of a child, a cruelty of which I never ſhall allow myſelf to be guilty again.

Could then an operation ſo ſimple, ſo ſucceſsful, and which had been practiſed for ſo many centuries, be forſaken? Yes, ſurely! covetouſneſs, vanity, and pride, incited phyſicians learned indeed, but little ſkilled in ſurgery, to invent more ingenious and complicated operations, forſaking the priſca ſimplicitas inſtrumentorum ſo warmly praiſed by Heiſter; for Heiſter himſelf, practiſed the operation of the leſſer apparatus, and explains to us the unworthy motives which induced phyſicians to

abandon it. "Their fees," he ſays, "were melting away! their gains and honours were intercepted by quacks! They invented therefore new and curious operations, not to cut men more eaſily for the ſtone, but to diſplay their learning. They firſt proved by an aphoriſm of Hippocrates, that wounds in membranous parts are mortal. Thence they deduced this rule, that, whatever external inciſions might be required, the neck of the bladder itſelf ſhould never be divided with the knife, but ſhould only be dilated with inſtruments of various forms. The memorable maxim in Celſus they willingly forgot, "That there is greater danger in dilating the neck of the bladder, than in opening it by inciſion." They choſe rather to dilate or lacerate the parts than to cut them. The ſimplicity of this method, by the leſſer apparatus, and the facility with which it is performed, were indeed their chief objections to it. Senſim a præſtantioribus ac celebrioribus chirurgis ac lithotomis ob varias rationes et *potiſſimum forte ne propter facilitatem methodi antiquæ* numerus lithotomorum nimis augeretur atque *reditus* illorum imminueretur, ſæpius quam minor fuerit uſurpatus. — "Thoſe," ſays Hieſter, "who chooſe to ſpeak contemptuouſly of this method, repreſent it as an operation fit only for quacks and mountebanks, as an operation too low and contemptible ever to be practiſed by regular ſurgeons and phyſicians: modern ſurgeons," ſays he, "have invented more cunning and curious methods, ſuch as the vulgar do not know; ſuch as muſt captivate all ranks of men, the rich and great, as well as the vulgar, by the profuſion and elegance of the apparatus."—"Sunt denique etiam, qui, quando de apparatu abjecte loqui et ſcribere volunt, dicunt, eum eſſe illum modum quo hiſtriones et circumforanæi tantum uterentur; veros autem et genuinos medicos et chirurgos haud decere adeo vulgarem obſoletam, *abjectam et ſimplicem methodum;* ſed recentiores chirurgos magis *excultas, artificioſas atque ingenioſas uſurpare ſecandi rationes* quæ copia et nitore ferramentorum arti ſplendorem, conciliarent atque *admirationem vulgi imo magnatum et procerum inſignem excitarent.*" Hieſter, page 178.

Such were the contemptible motives which induced men in the earlier times of ſurgery to invent that complicated operation which I am next to explain.



OF LITHOTOMY BY THE APPARATUS MAJOR.

SECTION III.

THE OPERATION OF JOANNES DE ROMANIS, OR OF SANCTUS MARIANUS BAROLITANUS.

The operation dignified with the ſonorous titles of Apparatus Major, and Marian Operation, was invented through motives of avarice, conceit, and folly, and by thoſe who deſpiſed the operation of Celſus, becauſe it was too plain, too ſimple, too eaſily performed, inſomuch as to have become the favourite operation of ignorant men.

They ſurely were ill qualified for inventing new methods, who declined the old becauſe it was ſimple! that which they invented, aſſuredly was not ſo! it was with incredible difficulty they extracted the ſtone through the narrow inciſion which was made in operating by the apparatus major; and, amidſt the violence of dilatating the parts, the cries of the patient were ſuch as it was not poſſible to hear without commiſeration. Their dilating inſtruments, their apparatus major, which was calculated to impreſs the great with admiration and reverence, ſtruck the patients with fear, and the ſpectators with diſmay. If Heiſter is to be truſted, and he was himſelf a plain blunt man, we muſt believe this new invention to have been the moſt criminal ever engendered by the deſire of gain! If we are to truſt to thoſe who ſaw it performed in all its perfection, it muſt have been the moſt cruel and horrible! what but cruelty and folly could reſult from the vain deſire of receding, as far as poſſible, from an operation which was avowedly very ſimple, and eaſily performed?

The reaſons which the inventors of this apparatus major were pleaſed to aſſign were but poor apologies for their conduct. They found out a text in Hippocrates, which declares, that "wounds of membranous parts are mortal; and thence they inferred that, in performing the operation of lithotomy, the bladder itſelf ſhould in no degree be wounded with the knife! They proceeded merely upon authority, and thought all was well if they could thus produce a text favourable to their deſign! The comments upon this text have been indeed perplexed and various, becauſe, like muſical accompaniments, they are modulated, ad libitum, according to the taſte and genius of the performer.

They had the cunning to pervert a general aphoriſm, a prognoſtic concerning wounds of the viſcera, to the particular purpoſe of regulating an operation which Hippocrates profeſſed not to underſtand, and from which he ſeems to have had an extreme averſion. They affirmed that the ancient doctrine forbade wounding the bladder, without recollecting that Hippocrates interdicted this operation to his diſciples only, becauſe it was practiſed by particular men *; and that thoſe profeſſed lithotomiſts, Ammonius, Meges, and others, performed their operation from the times of Hippocrates down to thoſe of Celſus entirely by inciſion. They forgot that it was the cuſtom of lithotomiſts not even to uſe the forceps, but to cut ſo fairly, that, after the inciſion was performed, they bolted out the ſtone with their fingers, or picked it out with a hook. They quoted the ancients in favour of dilatation, and forgot the ſecond or deep inciſion, the "altera tranſverſa plaga," of Celſus, "quâ cervix aperiatur."

Thoſe who invented the apparatus major deceived themſelves, by reaſoning on this ſuppoſed rule of Hippocrates; it was under pretence of avoiding membranous parts that they refuſed to open their way by inciſion, into the neck of the bladder: it was from the hopes of dilating the neck of the bladder as eaſily in man, where it is ſurrounded by the firm proſtate, as in woman, where it is not ſo, that they made their wound only upon the perinæum, opening nothing but the urethra, with the knife, and leaving the neck of the bladder to be torn by dilators: So much did they affect to fear the wounding of membranous parts, that they would not even approach the rapha perinæi, with their inciſion, but drew the ſkin to one ſide to avoid it. "Dextrâ vero manu," ſays Marianus, "dextrâ vero manu compactis æquatiſque digitis, pelliculam ad ſiniſtræ natis latus contrahat, ut *commiſſura* ad latus

* This was the part of the oath that related to lithotomy. "Neque vero calculo laborantes ſecabo, ſed magiſtris ejus rei peritis id muneris permittam." *Hippocrates.*

declinet, ne ſuper ea incidatur quoniam eſſet malum. *Eſt enim commiſſura ſecundum experientiæ veritatem locus mortalis, ſi ſuper ea incideretur.*" Thoſe who are moſt acquainted with the anatomy and texture of theſe parts, will beſt conceive the horrors of an operation in which nothing could be accompliſhed till the proſtate gland was burſt up with dilating inſtruments of various forms, for, in operating with the apparatus major, they tore thoſe delicate parts (perinæum and all) which they were afraid to cut, and talked confidently of dilating and gradually ſtretching the parts, while they were conſcious of lacerating them.

This operation was invented by Joannes de Romanis, a ſurgeon, of Cremona, in Italy, who might perhaps have been able to tell a plain tale how his operation was to be performed, but who did by no means preſume to write a book upon the ſtone. It will be recollected that the ſurgical obſervations of Paræus were leavened and kneaded up into chapters and ſections, by certain learned doctors of the univerſity of Paris; and the operation of Joannes de Romanis was in like manner delivered over to the talents of the learned and moſt eloquent Marianus Sanctus Barolitanus, who deſcribes it in magnificent terms. He ſeems at firſt ready to ſink under the ignominy of his ſituation, when obliged to acknowledge that this auguſt operation is to be performed even with a razor!—a barber's razor! but this humble inſtrument he ingeniouſly deſcribes in a ſtrain of moſt poetical metaphor. "Novacula Barbitonſorum peculiare eſt inſtrumentum quâ cum volunt barbam depexam abradere uno ipſius tractu mille ruunt capilli."—"The barber's razor, friendly reader, is a moſt important weapon, wherewith, when the buſineſs is to ſhave, cut cloſe, and utterly ſubdue a ſtubborn and rebellious beard, the barber mows down the hairs! thouſands falling before him at each remorſeleſs ſtroke!" Never was the pride and pomp of ſurgery ſo nobly ſupported as by this big-mouthed Marianus Sanctus Barolitanus; not an inſtrument is there under the apron ſtring of the lithotomiſt, which he does not celebrate in equal ſtrains; and as dilatation was the chief purpoſe of the operation, and dilators the peculiar and important inſtruments, the number of which characteriſed the operation, the deſcription of dilators proportionally excels that of the razor. "Look but to the aperiens," (and that you may look at this gaping aperiens, it is drawn on his margin)—"Look but to the aperiens! how it gapes with deſire, when the conductors have made way for its approaching, and, ſeizing the ſtone; it rages like the ferocious ſoldier ready to enter the breach in the walls of a beſieged city."—"Si quis modo inſpiceret qua hilaritate aperiens geſtiat, cum ductores

locum, quem illud viam ad lapidem extrahendam faciet præparâſſent, ipſum denique crederet non minorem voluptatem animo fovere quam qui ad diruendam urbem, quæ diu obſidione milites fatigaverit, accinguntur." Next come the voracious and vociferous forceps, roaring, and gaping for the ſtone. "For this," ſays Marianus, "is the drawing of the forceps themſelves, which often, when their morſel is too large for them to devour, cry out for the aid of their two ſupporters, or latera, which are then laid ſide by ſide with the forceps. Hæc eſt igitur forma ipſius forcipis qui ſibi duo latera aliquando jungi *vehementer vociferant;* cum bolum quem ipſe comprehenderat, præ magnitudine ſine duorum laterum auxilio, foras extrahere minime valuerit." Such were the magnificent deſcriptions tranſmitted to us by Marianus, of that barber's razor which, put in motion by his hand, mows down millions of hairs, "uno ipſius tractu"; and of the gaping dilators and roaring forceps, vociferating for help, and raging for the ſtone.

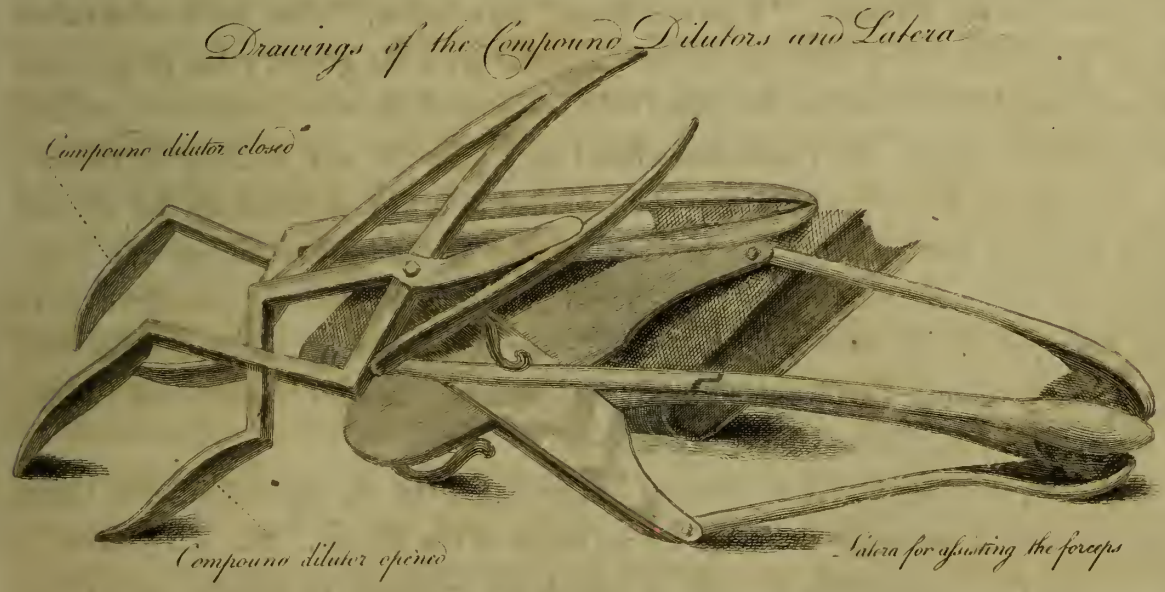
Theſe poetical eulogiums of the apparatus major do not belie the intentions aſcribed by Heiſter to innovators, who were, he ſays, inſpired by no better motives than avarice and pride. To ſeparate the ſenſe from the extravagance of theſe deſcriptions, and tell plainly what ſort of operation they performed, is no eaſy taſk. It would appear that the operator, kneeling on one knee, made an inciſion, with his razor, along the perinæum, to one ſide of the rapha; and, feeling with his little finger for the curve of the ſtaff, he opened the membranous part of the urethra, and fixing the point of the knife in the groove of his ſtaff, gave it to an aſſiſtant to hold while he paſſed a probe along the knife into the groove of the ſtaff, and thus into the cavity of the bladder. When the probe was thus paſſed into the bladder the urine flowed out, and, the probe being fairly in the cavity, the ſtaff was withdrawn. The operator next took in his hands two conductors, a ſort of ſtrong iron probes, the one (named the female conductor) having in it a groove like that of our common directory, the other (the male conductor) having a probe point, correſponding with that groove; and the grooved, or female conductor, being paſſed along the probe and lodged in the bladder, the probe was withdrawn, and the male conductor paſſed, in its turn, along the groove of the female conductor, till both were lodged in the bladder, lying along ſide of one another. Then commenced the operation of dilating: The lithotomiſt took a conductor in each hand, and by diverging their ſhafts from (a b) to (c d) dilated, or, in plain language, tore open the proſtate gland (e). (Vid. anatomical ſcheme of the operation by the apparatus major.)

Thus was the wound ſtretched by the conductors, that it might admit the dilator, which was an inſtrument reſembling forceps, whoſe points, by a ſort of double hinge, diverged and opened in proportion as the handles were preſſed together. The dilator being paſſed betwixt its two conductors, was preſſed into the narrow wound, and the conductors being held faſt and ſteady, the operator began to act ſlowly with his dilator, and by regular and ſucceſſive ſtrokes, continued to ſtretch the wound till he was ſenſible it could admit the forceps. Then the dilator was, in its turn, withdrawn, the great forceps preſſed in betwixt the conductors, were wrought forwards with a rotatory motion, till they paſſed into the wound; then they were turned round and round in the bladder, till they lay freely in the bladder, ſo that the operator could open them for the purpoſe of graſping the ſtone.

Theſe rules for performing this operation are delivered by Marianus in ſuch pleaſant terms, that nothing preſents itſelf to the imagination of the reader, but a ſucceſſion of eaſy operations; the probe gliding ſmoothly along the ſtaff! the conductors along the probe! the dilator along the conductors! and the forceps laſt of all. It was not till new and more ſucceſsful operations were invented, that the cruelties or dangers of this one were brought to light. Marianus plainly intended to write nothing but in the way of eulogium concerning that operation, which he contrived ſhould be called by his own name; nothing is ſaid of the lingering ſufferings or piteous cries of his patient; his hyperboles he reſerves for the praiſe of his irreſiſtible inſtruments; he ſpeaks of no courage but that of his gaping dilators, nor of any cries but thoſe of his vociferous forceps: but after-ages told another tale.

The book of Marianus contains the oldeſt deſcription we have, of an operation, which maintained its place for ſome hundred years, and loſt during all the period none of its horrors. Paræus was the immediate ſucceſſor, or rather the contemporary of Marianus; and, in his time, the cruelties of the apparatus major having become only more ſyſtematic and orderly, we can from his text ſupply whatever is left defective in that of Marianus. I believe that the dilatation performed by theſe operators might fairly be divided into three ſucceſſive ſtages. Firſt, ſuch a degree of dilatation accompliſhed by the diverging and drawing aſunder of the male and female conductors, as to admit the dilators: Secondly, ſuch a degree of dilatation accompliſhed by the dilator, the moſt cruel of all this apparatus, as to admit the forceps: Thirdly, a dilatation accompliſhed by turning the forceps, in all poſſible directions, till the operator found room to turn them freely in the bladder in ſearch of the ſtone, which was extracted by continuing to turn them from ſide to

ſide. Paræus dilated, more than other ſurgeons, with the forceps; firſt he introduced his conductors, which were indeed eſſential to the introduction of the forceps; then the duck-bill forceps were thruſt, with violence, betwixt the conductors, into the cavity of the bladder; "then the forceps were opened with both hands, turning them forcibly at the ſame time, from right to left, this way and that way, to dilacerate and enlarge the wound."—"Puis l'ouvrir de deux mains, les tournant à dextre et ſiniſtre, *çà et là, pour dilacérer et aggrandir le playe.*" "And next, Paræus when he could not prevail, and it was neceſſary to dilate the wound ſtill more largely, betook himſelf to the inſtrument named dilator." But every ſucceſſive ſtep of the operation excels the preceding one in ingenious cruelty; the latera or ſides, which are deſcribed by Marianus as aſſiſting the forceps (when they have roared in vain), are plainly and ſimply deſcribed by Paræus, under the name of ailerons or wings. They are uſed as aſſiſtant forceps, but the forceps filling up the wound, and the operator unwilling to loſe his hold of the ſtone, the two latera were paſſed by the ſides of the forceps, and locked upon the ſtone, ſo that the whole reſembled a four-bladed forceps; but with this peculiarity, that the latera or aſſiſtant forceps were ſo hinged upon each other, that upon claſping the handles, the points cloſed, and the hinges at the ſame time roſe, ſo that the inſtrument ſerved at once the double purpoſe of dilators and aſſiſtant forceps. That the cruel manner in which the general operation was performed, may be fully underſtood, I have here given a plate of thoſe dilators:



Yet none of the direct rules for performing these cruelties make so strong an impression upon my mind, nor so plainly prove the cruel nature of the invention, as the accidental disputes about the use of the dilator. Next to Marianus and Paræus came the family of the Collots, who practised this dilatation with great assiduity, and affected particular dexterity in the use of the dilator. They had been famous lithotomists for eight generations, during all which period they had kept their operation a secret, till, at length, a book was found in the closet of the elder Collot, written in his old age, after he had ceased from the labours of his profession, containing an authentic history of his operation. This man was contemporary with Paræus: he had been elected royal lithotomist (the first who held that title) under Henry II. of France: his operation, which he had learned of a lithotomist, of the name of De Ville, was plainly the Marian operation, with no peculiarity that I can perceive, unless it be the peculiar dexterity with which he affected to use the dilator, though little credit surely can be given to any report of a mysterious and cunning way of using an instrument which can plainly do nothing but lacerate, and that rudely.

The occasion which excited Collot to defend the use of the dilator is this: The gorget was first invented in the time of Collot; it was not, during many centuries, a cutting instrument, but merely a blunt wedge, a scoop of a conical form, which, from the form of its beak, slipped easily along the groove of the staff, and by its wedge-like shape dilated the wound, and by its groove or hollow served as a conductor for the forceps. "I do not deny," says Collot, "that those who refuse to use the dilator may find themselves successful with the gorget; the gorget may be a commendable invention: but this I will say, that those who thought it necessary to invent the gorget, must have understood very little the way of using the dilator; for the use of this instrument may be regarded as a sort of secret in the art not to be acquired but by being taught." "L'usage de cet instrument pourroit passer pour une espèce de secret difficile à penetrer sans une instruction particuliere on ne doit dons pas abandonner le dilatoire.—*L'usage du dilatoire est tout le secret de notre operation*, il dispose l'orifice de la vessie qui est naturellement très serré au relachement, il vide a manier les autres instrumens."

In short, dilating was the essential circumstance in the operation, and Collot plumed himself upon the dextrous use he made of the dilator. He was profuse in his praise of an instrument, the use of which he regarded as peculiar to his own family. "It is (says he) our whole secret in operating; it is by the dextrous

management of this inſtrument that we get the free uſe of all the others; it forwards the dilatation of the cervix veſicæ, and a little reflection will perſuade us that the affair has been miſrepreſented! The dilator is indeed painful in its introduction, but it is a pain which laſts but for a moment, and is to relieve the patient from the more excruciating torments of his diſeaſe," p. 314.

There is one precaution repeatedly inculcated by Marianus and others, which demonſtrates, in a particular manner, the violence with which this dilatation was performed, and it is this: "that while the dilator was paſſed betwixt the male and female conductors, it was neceſſary to hold them perfectly ſteady and firm!" What does this mean? why, that the dilator was forced in betwixt the conductors or grooved probes with ſuch violence, that if they were not held perfectly firm, they were in danger of being carried forward along with the dilator, and driven through the very fundus of the bladder. "A ſurgeon, little ſkilled in the operation of lithotomy, called together ſome of his friends, ſurgeons, and phyſicians, and among others Saviard (who relates the fact), to witneſs an operation. Although (ſays Saviard) it is not only neceſſary to keep the conductors ſteady, but in ſome degree to retract them while the dilator is puſhed onwards, this unfortunate ſurgeon puſhed on his dilator into the bladder, regardleſs of what might happen; allowed the conductors to be puſhed along with the dilator, and they pierced the fundus of the bladder. The ſurgeon had the good fortune to catch the ſtone before it eſcaped through the rent into the cavity of the abdomen. But while he was extracting the ſtone a piece of fleſh protruded, which he, (letting go the ſtone,) reduced with his finger, and would again have introduced his forceps, but that Saviard, conſcious of what had happened, prevailed with him to refrain. The little girl on whom this operation was attempted, being put to bed, died in great agonies on the fourth or fifth day.

"Upon opening the body, the conductors were found to have pierced the bladder at its fundus, the opening being ſuch as might permit a hen's egg to paſs through it. In trying a ſecond time to extract the ſtone, the forceps, ſtone and all, had been driven through the rent, and the ſoft ſtone giving way under the preſſure of the forceps, was found crumbled in the cavity of the abdomen. The ſpongy piece of fleſh which they had ſeen protruding through the wound, was a part of the ilium." This explains but too well the uſe of thoſe little chains and croſs pins which are drawn at the conductors of Paræus, for the croſs pins were paſſed through the holes to prevent the conductors being puſhed too deep. The con-

ductors of Joannes de Romanis Marianus, and others, were guarded by crofs handles, like that of a Roman fword.

One circumftance more gives us a terrible conviction of the cruelties of this operation, it is the ufe of the canula: In truth the wound of the Marian operation never healed, it continued, in four out of five cafes, fiftulous for life; and the immediate difcharge from the bruifed and lacerated parts, required to be conveyed away as from the cavity of an abfcefs, by a tube. In the old method of amputating limbs the furgeon allowed the arteries to bleed, oftenfibly to prevent plethora, but really becaufe he could not ftop them. In the old way of lithotomy they introduced the canula into the wound, oftenfibly to prevent healing, but really becaufe they could not heal the wound. They were exceedingly at a lofs for refpectable reafons in favour of the canula; Collot affects to quarrel with Frere Jaques for healing the wound too early: "This man," fays Collot, "were he but learned in anatomy, and fufficiently honeft, would acknowledge the danger of healing up the wound too early: wounds of the fleffhy and mufcular parts may indeed be clofed, becaufe they heal from the bottom, but not fo in wounds of the bladder, where you unavoidably leave a cavity behind. The wound (fays Collot) muft then be kept open with the canula: Firft, for fear of fuppreffion of urine in confequence of a precipitate cure; fuppreffion of urine being a natural confequence of what the cervix fuffers during operation (qui fe fait au fphincter par le travail de l'opération): Secondly, it is neceffary, inftead of immediately healing up the wound, to allow a due time for the fuppuration of the wounded parts, and the recovery of the bladder after the long preffure of the ftone: Thirdly, the patient would be in a very critical condition indeed, were there no outlet preferved for the efcape of whatever fragments and particles are broken off the ftone by the forceps: Fourthly, it is neceffary continually to cleanfe and purify the bladder from the feculences and difcharges, which are collected in greater or leffer quantity, according to the period during which the patient may have laboured under the ftone; and it is occafionally neceffary to clear the bladder of fungous and other tumors, which often torture the patient till he dies." That the patient often died, and that his bladder, when he furvived, was flowly purified, I fincerely believe; but in truth they were often altogether unable to extract the ftone through the narrow wound made in operating with the apparatus major; the canula was left in the wound as a channel for the urine to pafs off by; and the canula by preventing any fulnefs of the bladder, or any action which might make it comprefs the ftone, did in fome degree affuage the pain.

Le Dran, ſpeaks like Collot, in very familiar terms, not only of leaving the canula in the bladder, but even of leaving the ſtone. "If in order," ſays Le Dran, "not to fatigue a diſtempered bladder, it be judged proper to leave the ſtone there, as I have ſeen done by a great man of our age, who, in this caſe, waited till the bladder was relaxed by the ſuppuration, to make the extraction, the paſſage remains always open and eaſy to introduce a forceps." This is the Operation en deux temps; i. e. leaving an interval betwixt the inciſions and the extraction of the ſtone, which has been boaſted of, like many other antiquated conceits, as an important innovation.

Even in the time of Collot, men began to revolt from the uſe of the dilator, and ſuch were the cruelties of the whole apparatus, that the moment Frere Jaques appeared, (who, though rude and ignorant, was the firſt who taught us thoſe bold and maſterly inciſions which the operation requires,) all men turned to him, and he was followed by Raw, Cheſſelden, and all the great ſurgeons and lithotomiſts of that age. Yet it muſt be confeſſed that there remained, for many years, a leaven of the old ſchool; the ſtaunch old defenders of the apparatus major died out, but they left behind them a ſort of neutral corps, who had, in their younger days, been taught this operation of the apparatus major, but had not yet performed it profeſſedly, nor found their own reputations connected with the fate of it. They ſeemed inclined even to deceive themſelves, by retaining the forms of the old operation while they eſſentially performed the new. They began, indeed, their operation, as in the old way, by cutting low in the perinæum, and opening only the bulb and membranous part of the urethra; but they finiſhed by running the knife forward and cutting the proſtate gland. This laſt motion of the knife, by which they ſlit up the proſtate, they thought fit to deſcribe as ſingularly myſterious, and they called it the Coup-de-Maitre, or cunning ſtroke! Such was the paltry device by which they reconciled their old faith with their new practice; they ſlipped in the knife, unobſerved by the ſpectators, and cut more than they choſe to confeſs; they ſatisfied their conſcience, by performing ſomething like the right operation, and ſaved their reputation by appearing to perform the wrong one; they affected that myſterious dexterity which profeſſed lithotomiſts have found ſo profitable in all ages.

Among the moſt conſpicuous of this neutral corps was the famous Le Cat, a lithotomiſt of Rouen, in Normandy, whoſe writings develope all the principles of thoſe who profeſſed the apparatus major. He was a man of as ſingular defects and excellencies, as ever fell to the lot of one individual: he had as a polemical writer

rapid conceptions, addreſs in argument, and a neat and eloquent ſtyle; talents for mechanical inventions he certainly poſſeſſed, and he had an unbounded paſſion for curious inſtruments and complicated operations. But theſe excellencies were counterpoiſed by defects of a moſt dangerous tendency: he was ambitious of being regarded as an original inventor, and would not condeſcend to perform an operation which was not peculiarly his own: his notions on the moſt important points in ſurgical pathology were very perplexed, and his correct knowledge of anatomy he perverted to the moſt abſurd purpoſes: he was altogether defective in ſenſe, ſteadineſs, and ſound judgment: he perſiſted in operating, during all his life, with knives of the moſt uncouth forms and an apparatus extremely complicated, and which he was changing from day to day: he was ſo infatuated, that when his friend and kind maſter, Morand, after returning from England, put the ſimple knife of Cheſſelden into his hand, and taught him to uſe it, he ſaid it was naught, and returned to his own crooked armoury: he perſiſted in proving, very eloquently, that dilatation was the moſt commendable way of operating, after the conviction had come home to his own mind, that inciſion alone was ſafe! after it had become indeed his practice! for he actually divided the proſtate, and that movement of the lithotome or knife, which others called the Coup-de-Maitre, he named *le debridement du Col de la Veſſie*, the unbridling of the ſphincter.

Thus it was the fate of a man of talents to write volume after volume, without making one convert, and to cut hundreds, by an apparatus ſo ingenioufly complex, that he never prevailed, during all his life, on one lithotomiſt, pupil, ſurgeon, or even quack, to adopt his operation.

To explain the complicated operation of Le Cat, belongs (if indeed ſo extravagant an operation can excite any intereſt) to another ſubject. His doctrines, more intereſting, may be told in a few words: they have an intimate relation to the ſentiments of the other great lithotomiſts of his time, and eſpecially to the opinions and practices of the celebrated Le Dran. The myſterious doctrine of the dangers ariſing from wounds of membranous parts, is his chief and favourite theme, and it is mortifying to obſerve how little good faith is to be looked for, when a favourite doctrine is to be maintained, how trivial an argument, how ſlight an authority, how imperfect an analogy, will ſatisfy the dogmatiſt who would rather eſtabliſh his own favourite theory than diſcover truth. Little acquainted with general pathology, the theoriſts of the laſt age confounded the dilatation of parts with their growth, and maintained, that parts may be dilated without violence, becauſe they grow by nature. The

firſt leading analogy they fell upon, was that of the womb, which is in the pregnant ſtate dilated (as theſe theoriſts ſay) to an enormous ſize.—No! it is not dilated, it grows, there is a real increaſe of matter both in the contents of the veſſels and in the ſolid ſubſtance of the womb, which increaſe of matter is, after delivery, very ſlowly evacuated or abſorbed: Le Cat might as well have adduced the growth of the fœtus from an inviſible ſpeck to a luſty child, as an inſtance of dilatation! Yet from ſuch inſufficient proofs did the defenders of the old operation deduce this concluſion, that nature had ſet no limits to the dilatation of membranous parts, as the bladder of urine, the hollow viſcera, and the uterus *.

"The dilatability of the hollow organs," ſays Le Cat, "is moſt conſpicuous in their orifices, as is exemplified in the orifices of the bladder and womb." Le Cat and other ſupporters of the ſyſtem of dilatation reaſoned, as if there exiſted a real analogy betwixt the orifice of the womb, deſigned by nature for the moſt perfect dilatation, (viz. that neceſſary for the delivery of the child) and the orifice of the bladder plainly intended by nature, for the moſt perfect and cloſe contraction, ſuch as is neceſſary for retaining the urine! indeed the cloſeneſs of this orifice is ſuch as to reſtrain the urine, although continually preſſed by a ſlight action of the bladder, by the preſſure of reſpiration, and by the weight of the incumbent viſcera; and this orifice which is permanently in a ſtate of the cloſeſt contraction, never, even during the momentary efflux of the urine, ſuffers any but the ſlighteſt dilatation. Such analogies, ſo abſurd and inconcluſive, muſt ſurpriſe any man of ſound ſenſe and judgment, but what muſt be his reflections when he firſt perceives that a theory ſo extravagant as this is deſigned as a vindication of the moſt cruel and unnatural practice? when he finds thoſe theoriſts preſuming to put their horrible operation of tearing the neck of the bladder, on a parallel with the natural dilatation of the womb. The extravagance of ſuch reaſoning never ſtartled thoſe theoriſts, nor did the cruelty of the propoſed innovation alarm them; they meant, bonâ fide, to dilate the neck of the bladder, ſo as to permit the ſtone to paſs, in women, without any previous

* *Principes de la théorie de la Taille, neceſſaires au parallele des deux methodes propoſées.*

PROPOSITION I.

Les parties membrano-nerveuſes, peu muſculeuſes, telles que la matrice, la veſſie, &c. ſupportent les plus grandes dilatations ménagées ſans accidens. J'appelle dilatation menagée celle qu'on fait peu à peu, par degrès, en étendant les fibres, ſans les rompre.

Les preuves de cette propoſition ſont ſans nombre. La groſſeſſe eſt une démonſtration journaliere de la dilatabilité de l'utérus. La veſſie ne le cede point à l'utérus par cette proprieté.

incifion, and in men, with only the outward incifion of the fkin and mufcles. They did not fcruple to lay down this rule in the moft decifive terms, but plainly and openly avowed it as their belief, that "*the bladder, like the womb, was capable of this fort of childbirth* *." The errors of Le Cat, an able but ignorant man, may be excufed; far from being capable of eftablifhing analogies or reafoning on pathology or the theory of furgery, he feems fo ill inftructed in logic that his proof of thofe two parts being equally capable of dilatation becaufe they are both orifices, muft remind us of the parallel attempted by Fluellin, betwixt Macedon and Wales: "If you look now in the map of the 'orld, I warrant you fhall find, in the comparifons between Macedon and Monmouth, that the fituations, look you, is both alike; there is a river in Macedon, and alfo moreover, a river at Monmouth: it is called Wye, at Monmouth; but it is out of my prains, what is the name of the other river, *but it is all one, they are as like as my fingers is to my fingers.*" The celebrated Dr. Hunter, as he was a man of learning as well as genius, was lefs pardonable, when he inferred the dilatation of the pelvis during labour, from the dilatation of the womb in labour; for, in order to prove that the dilatation of the womb, and that of the circle of the pelvis were equally natural, he fhould have to proved that they were both orifices, and both equally narrow at the commencement of labour.

That their theory might feem lefs prepofterous, and their practice not unnatural, they undertook to prove, that they were, in fact, but repeating a very ufual operation of nature, fince women often pafs ftones of very great fize, without any help; and that great lithotomifts have, upon the authority of this fact, operated on women, by the apparatus major, (i. e. by mere dilatation, by thrufting the dilator through their fhort urethra into the neck of the bladder,) without ufing the knife †.

From thefe mifconceived analogies of the bladder, and of the womb, and the

" * Propofition II.

" La dilatabilité des organes membrano-nerveux qui ont la forme d'une bourfe, eft plus confidérable à leur orifice qu'en aucun autre point de leur furface.

" Cette propofition eft prouvée par les faits dans les deux organes qui viennent de nous fervir d' exemples. L'orifice de l'utérus naturellement très etroit, fe dilate dans l'accouchement jufqu' à laiffer paffer un enfant. Les obfervations nous aprennent que la veffie eft auffi capable d'une efpèce d'accouchement."

† " L' uréthre des femmes fe dilate extraordinairement," dit la Vauguion, dans fon Traité des Opérations, p. 118.; " ainfi il arrive rarement qu'on foit obligé de leur faire opération."

Nuk, dans fon Traité des Operations, p. 138, s'exprime de même. Dionis, p. 237., eft auffi pour la taille des femmes *par dilatation*, qu'il appelle le petit appareil, et il affure que leur uréthre eft dilatable au dela de ce

imaginary reſemblance of the organs in both ſexes, this cruel doctrine was inferred; that the cervix veſicæ ſhould be dilated in true conformity with the operations of nature * in like caſes. "That nature muſt be correctly imitated, which to facilitate the paſſage of the child dilates the womb ſlowly; and, by intervals correſponding with thoſe of the pains of labour; ſuch, of courſe, ſhould be our method of dilating the urethra ſlowly and gently."

Le Cat having tranſcribed this extravagant notion from Le Dran, exclaims in raptures, † "Is not this admirable ſurgery! I do confeſs that I no ſooner read the ſentence than I ſent the diſcourſe to M. le Blanc, enchanted to find my ſentiments correſponding ſo expreſsly with thoſe of that celebrated ſurgeon."

But when theſe theoriſts had arrived at the end almoſt of their career, an obſtacle, of no little importance, preſented itſelf to their imagination; viz. the difference in the organs of the two ſexes. "Nature, we muſt avow it," ſays Le Cat, "has ſet bounds to this dilatation in man, by the firmneſs of the proſtate gland, with which nature has encircled and fortified the entrance of the bladder. Yet even this gland, and its follicules and ſinuſes, are ſuſceptible of dilatation in ſome degree; and the lithotomiſt, when he ventures to undo this obſtacle, by a ſmall inciſion in the proſtate, makes way for a free dilatation of the bladder itſelf ‡." Thus their proud theory of dilatation ends plainly in inciſion, and the dividing of the proſtate gland, which others named, "Coup de Maitre," is named by Le Cat and Le Dran, "Débridement du Col de la Veſſie;" thus did they deceive themſelves and impoſe on others by a change of names.

qu'on peut croire. M. de la Faye, dont le Commentaire ſur ce livre eſt imprimé en 1740, eſt du même ſentiment, et ne decrit pas une autre méthode.

"Les femmes pierreuſes," dit le celèbre Heiſter, "ſont ordinairement plus heureuſes que les hommes, en ce qu' elles peuvent ſouvent être delivrées de la pierre, ſans être expoſées à une inciſion dangéreuſe, et qu'une ſimple dilatation de l'uréthre, ou du col de la veſſie." &c.

* "On peut ſe diſpenſer de faire aucune inciſion, et il faut imiter, autant qu'il eſt poſſible, la nature, qui, pour faire paſſer un enfant par le col de la matrice, l'écarte peu à peu, et a diverſes repriſes, à l'aide des douleurs que la femme reſſent. *Il faut donc faire prêter de même uréthre et le cou de la veſſie peu à peu, et ſans trop les forcer.*"

† "Voilà ce qui s'appelle de la bonne chirurgie. J'avoue que je n'avois point lû cet endroit, quand j'ai envoyé cette diſſertation à M. le Blanc, et que j'ai été enchanté de me rencontrer ſi juſte, comme on la verra à l'article de la théorie, avec un praticien auſſi conſomnié que M. le Dran."

‡ "La nature paroit avoir voulu mettre des bornes à cette dilatation dans l'orifice de la veſſie, par la proſtate, corps glanduleux et ferme, dont elle a muni la partie antérieure de cet orifice. Néanmoins la gouttiere des lobes de cette glande, les follicules mêmes de ces lobes, ſont ſuſceptibles de beaucoup de dilatation, *mais le lithotomiſte qui a encore l'intention d'inciſer l'une de ces barrieres, ouvre par-là une voye libre à la plus ample dilatation.*"

There wanted but one argument more to complete the proofs of Le Cat's doctrine; viz. that he ſhould be able, after ſo many bad arguments, to adduce ſome unlucky operations done with the knife; this was perfectly eaſy, he had but to make the experiments himſelf, and with his own knives, and even this he condeſcended to do in compliment to his favourite theory. It will be recollected that his kind maſter, Morand, had, upon his return from England, put the knife of Cheſſelden into his hand, but Le Cat refuſed his inſtructions; he did indeed, perform the operation of Cheſſelden, (not with Cheſſelden's knife but his own,) unwillingly, and aukwardly, no doubt, on nine patients, in the Hotel-dieu; of theſe nine patients ſix died, and this infatuated man ventured to produce publicly, the ill ſucceſs of his own mal-adroit operations, as a proof of the danger of wounding the neck of the bladder! there was no contending with one who could bring ſuch damning proofs *.

Le Cat, by all his reaſonings and experiments, imagined that he had eſtabliſhed the following concluſions: that wounds of membranous parts were mortal, and that dilatation of membranous parts, as of the urethra, bladder, womb, is ſafe if ſlowly performed: That ſince dilatation is leſs dangerous than inciſion, that which is leſs dangerous ſhould predominate, we ſhould make our way therefore into the bladder more by dilatation than inciſion: That, in ſhort, lithotomy ſhould conſiſt of inciſion and dilatation combined; little inciſion, much dilatation, and no laceration. Such are the definitions and principles of his own peculiar operation, which, if not directly announced in any one paſſage, may, at leaſt, be collected from his illuſtrations and reaſonings.

But my reader cannot be without ſome deſire to know what the words were of this boaſted aphoriſm, by which thoſe innovators maintained their theory of wounds in membranous parts being mortal. Hippocrates ſays, in his 18 Aphor. ſect. 6. "VESICA DECISSA, AUT CEREBRO AUT CORDE EST LETHALE."—What is this? Is it authority for avoiding or preferring any thing particular in lithotomy? by no means; it is merely a general prognoſtic concerning the danger of wounds of the viſcera; and whoever had made himſelf acquainted with the writings of Hippocrates,

* "L'inciſion intérieure coupoit le dedans de la proſtate, le col de la veſſie, et environ un grand pouce, ou un pouce et demi de ſon corps. Elle n'intéreſſoit, ni le rectum, ni aucune autre partie reſpectable. Confirmé pas ces eſſais, je me reſolus d'ajouter ce nouveau degré de perfection à notre méthode.

"Le 7 Mai 1735, je taillai avec ces inſtrumens quatre ſujets en huit minutes; le premier Juin, cinq autres avec la même aiſance: de ces neuf ſujets, quatre ſont morts dans la huitaine, deux après la quarantaine."

Anatomy of the Apparatus Major.

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Fig. 1st.

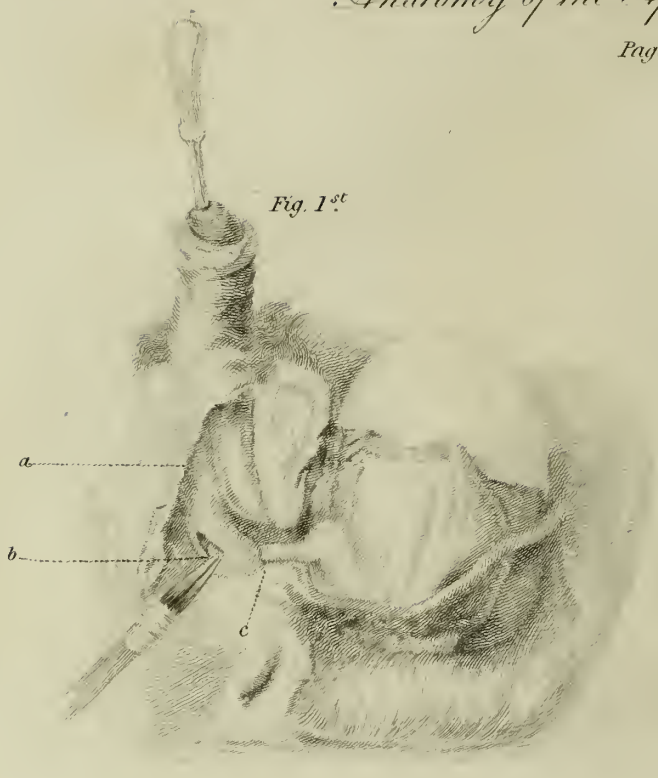


Fig. 2nd.

Fig. 3d.

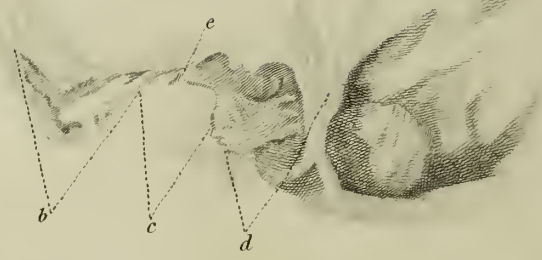
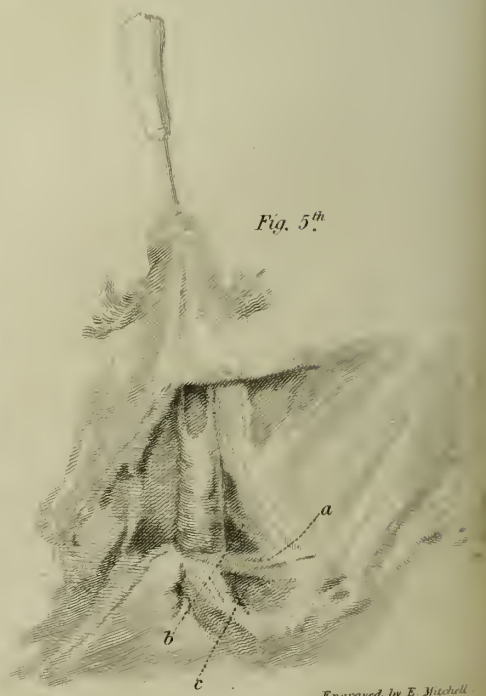


Fig. 4th.

Fig. 5th.



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Engraved by E. Mitchell.

or remembered the promiſe he exacted of his pupils, never to cut for the ſtone, might have predicted that thoſe who ſearched into the works of Hippocrates for authority on ſuch a ſubject, would be obliged to content themſelves with ſome vague and general text. This is the ſole authority that Le Cat has ventured to quote: after ſome abortive attempts to reconcile the practice of Celſus, who directs deep inciſions, with the ſuppoſed precept of Hippocrates about membranous wounds, he concludes his reaſoning with an argument unanſwerable in his days, and requiring no anſwer in ours. "Toute l'antiquité a ſuivie ces grands hommes."—"All antiquity," ſays Le Cat, "has followed theſe celebrated men," and he intended no doubt, that all poſterity ſhould follow in the ſame path.

Theſe are not unimportant debates; every theory in ſurgery involves (as this certainly involved) the lives of thouſands; and the manners, the learning, and the operations of the profeſſion, in that age, may afford uſeful leſſons to modern times.

ANATOMY OF THE APPARATUS MAJOR.

Let us, in order to profit by the miſtakes of our predeceſſors, put this operation alſo to the teſt of anatomy.

Firſt, as it was the deſign of theſe learned lithotomiſts not to cut, but dilate the bladder, their inciſion did not paſs the anus or tuber iſchii; did not extend to the hip; did not lay open that great hollow by the ſide of the rectum, in which the neck of the bladder is felt by the finger, and through which alone, the ſtone can paſs eaſily: their inciſion hardly reached the anus, it hardly extended indeed beyond that point where ours begins: they cut only the perinæum where the bulb of the urethra lies: they did not penetrate to the neck of the bladder, they ſlit up merely the bulb of the urethra, from (a) to (b), fig. 1.: their inciſion ſeldom extended to (c); the danger of wounding membranous parts was the main theory of their operation, wherefore they reſerved the membranous part of the urethra along with the neck of the bladder, to be torn, by the force of dilators *.

* In the *grand apparatus* the *urethra* is cut by the lithotome at its *bending*, and the inciſion ends *almoſt an inch and a half on this ſide the proſtate*. What compoſes the reſt of the ſtone's paſſage is the bulb of the urethra, which is *aponeurotic*. Le Dran.

"Ce qui me fait croire que la plus grande difficulté qu'ont les plus habiles lithotomiſtes à tirer la pierre, vient moins ſouvent de la part du col de *la veſſie, que de la part de l'uréthre*, parce que ne coupant l'uréthre, comme ils

That the membranous part, the narroweſt and moſt delicate part of the urethra, ſhould be dilated without being torn! dilated, ſo as to allow the ſtone and the great forceps to paſs along the canal, is a thing ſo incredible that there cannot remain the ſmalleſt doubt that by thoſe who operated with the apparatus major, it was lacerated to very rags and tatters! And after it was ſo laceratd, the ſame dilators were advanced deeper into the neck of the bladder, and new lacerations begun.

Now, it is neither the needleſsly ſlitting up of ſo great a length of the urinary canal, nor the extenſive wound of the bulb, nor the profuſe hæmorrhage from its cavernous body, that we have to remark; but this was particularly lamentable, that the urethra being torn to rags in this way of operating, never could regain its form, but waſted in ſuppuration, ſo that the patient had an incurable fiſtula, with impotency, the urine and ſemen iſſuing by the perinæum.

Secondly, the new lacerations here mentioned above, are thoſe of the neck of the bladder and proſtate gland; and to conceive truly of the effects of this ſecond dilaceration, we muſt reflect on the ſtate of the parts. The urethra is truly repreſented in fig. 2. lacerated at (a), torn even to the apex of the proſtate gland; Le Dran, himſelf the ſupporter of the apparatus major, confeſſes, on various occaſions, that this membranous part is incapable of dilatation, that it tears when forced by the conductors; that it is rent on that ſide which lies againſt the rectum *. Imagine then this delicate part of the urethra, rent as repreſented at (a): the male and female conductors (b and c) paſſed through the ring or ſtricture of the urethra into the bladder: imagine the handles of thoſe conductors farther diverged from (b c) to (d e): imagine the dilator, the gorget, or the forceps, wedged in betwixt them for the purpoſe of completing the dilatation, and you will be able to predict what muſt happen. It is impoſſible to uſe much force in one direction, without its operating (eſpecially among ſoft and moveable parts) in all directions! it is impoſſible to dilate, or attempt to dilate the gland, without puſhing it back! and when the gland is thus forced back into the pelvis, while the urethra, already lacerated and incapable of

ſont, qu' au devant des os pubis; et le col de la veſſie étant placé au derriere de ces os, il *reſte d'ordinaire ſous l'angle qu' ils forment par leur union, un pouce ou environ du canal de l'uréthre qui n'a point été coupé à traverſer.* Or ce canal étant plus étroit que le col de la veſſie; il y a donc bien plus d'apparence que la difficulté qu' ont tous les lithotomiſtes à tirer la pierre, vient moins de la part du col de la veſſie que de celle de l'uréthre." Mery, page 68.

* Whichever of theſe methods is choſen to make the dilatation, it cannot be accompliſhed without opening the whole canal along the ſide of the rectum. *Le Dran.*

reſiſtance, is retained by its connexion with the pubis, what can ſave it from being entirely ſeparated from the bladder? The diverging of the conductors, the driving in of the gorget, the ſtrokes of the dilator, the ſtretching of the chops of the forceps, all tend to ſeparate the bladder from the urethra; even the boring the finger into the firm ring of the proſtate, might occaſion this ſeparation: in a long and violent operation with the apparatus major, it is merely impoſſible that this part of the urethra ſhould eſcape.

Thirdly, this terrible conſequence of the ſecond laceration is demonſtrated by the third drawing or ſcheme, which repreſents truly the condition of the parts. The bladder is repreſented as open, and the ſtone (a) is ſeen in it, lying near the neck. The bulb (b) is ſlit up by the inciſion of the knife; the inciſion is continued in the laceration (c), which extends the whole length of the membranous part of the urethra; the laceration (d) of the proſtate, the part next in ſucceſſion, is repreſented, as it always muſt have been, very irregular; and the almoſt total ſeparation of the urethra from the bladder is repreſented at (e), where only a few threads and fibres of the cellular ſubſtance are ſeen remaining entire. Nor is this hypothetical merely, the fact is proved by every kind of evidence. In all the experiments of Le Dran, who diſſected bodies to diſcover the conſequences of each method of operating, the proſtate gland was found (when he dilated with the apparatus major) to be ſevered from the urethra, by the labouring with the dilating inſtruments: All the reports of Mery, Le Cat, Saviard, and others, who diſſected thoſe who had died after the operation of the apparatus major, confirm the fact. The proſtate gland was as fairly ſeparated from the urethra, by the violence of this rude dilatation, as when the urethra was cut acroſs by Frere Jaques, and others, who operated by the gripe without a ſtaff: nor is there one writer in favour of the apparatus major, ſo diſhoneſt as to deny that incurable fiſtulas were the frequent conſequence of it; even Le Dran confeſſes it in theſe terms: "It is likewiſe true that ſome patients have remained fiſtulous; but this never happens but in two or three caſes, as when there *has been a very great dilaceration;* when to extract large pieces of a broken ſtone, or to make a diſtempered bladder ſuppurate, they have been obliged to leave a cannula long in the bladder; or in fine, when the patients have been much waſted during the courſe of their cure."

Fourthly, If there was difficulty in getting into the bladder, by the dilating inſtruments of the apparatus major, there was ſtill greater difficulty in extracting the ſtone. The eaſy extraction of the ſtone depends not on the free inciſion of the proſtate

bladder, or other internal parts, but on the proper diſſection of the external parts, for which there is one great and invariable rule.—"To cut fairly acroſs the tranſverſalis or triangular muſcle which bars the perinæum," a ſhort inciſion, ſuch as was uſed in the apparatus major, an inciſion, I mean, which falls ſhort of the middle point, betwixt the anus and the tuber iſchii, is not only inſufficient as it is ſhort, but undilatable, as it is bounded by the tranſverſe muſcle, ſtill undivided. In the old operation, their outward inciſions were made almoſt as timorouſly as their internal inciſions; and the delivery of the ſtone, when actually ſeized by the forceps, was a third ſtage of dilatation more difficult than even the introduction of the dilators; for, with the dilators, the comparatively delicate parts, the urethra and neck of the bladder alone, were forced, but with the forceps, the muſcles of the perinæum, which can hardly be made to yield, were to be dilated.

This point, which bears perhaps a more intereſting analogy to our modern operation than any other circumſtance of the old one, I have thought it right to illuſtrate by figures 4, and 5., where both the place and the effect of this inciſion are clearly expreſſed. The inciſion, in numb. 4., is the true inciſion of the old lithotomiſts, and ſuch as but too many modern ſurgeons are apt to make; it hardly paſſes the anus, or paſſes it ſuperficially in the ſkin, while the parts within are not divided, and the perinæum continues bridled and conſtricted by the tranſverſalis perinæi (a), fig. 5. The inciſion reaches that part (b) of the great hollow oppoſite to which the membranous part of the urethra lies, but not the part (c) of the cavity of the pelvis, oppoſite to which lies the neck of the bladder and body of the proſtate.

I will take this fair anatomical ſcheme, as my warrant for affirming, that if the apparatus major was, as Heiſter ſays, "A baſe and ſelf-intereſted invention!" it was, at the ſame time, the moſt cruel and horrible that ever entered into the heart of man to conceive; the proofs of this may be found in every circumſtance already related.

This laborious, and ſometimes unſucceſsful operation, laſted not unfrequently for an hour, amidſt the agonies of the patient and the ineffectual ſtruggles of the ſurgeon. The greateſt maſters aſſure us, that the chief difficulty lies in dilating, and the moſt conſummate in this art of dilating, dilated ſlowly, fibre after fibre, till the finger, or the forceps, could be admitted into the ring or ſtricture of the gland. Collot, and thoſe who affected to perform the moſt perfect operation, regarded the right management of the dilator, as the chief ſecret in lithotomy, and accuſed the igno-

rant of tearing, only becauſe they knew not how to dilate, fibre after fibre. Le Dran, with the perfect compoſure of a philoſopher, calculates the degree in which the dividing of the points of laceration, by dilating ſlowly, leſſens the pain. "The inciſion of the urethra is," he ſays, "unqueſtionably prolonged into the neck of the bladder, but every line of the canal is ſeparated one after another, and thus *one very acute pain is divided, into ſo many leſſer pains as there are points of dilatation.*" Such ſophiſms were but ſlender conſolations to thoſe who were thus put to the rack, "for who can hold a fire in his hand, by thinking on the frozen Caucaſus." To all their cold-blooded apologies for this cruel dilatation, the plain words of Dionis give the lie; he was himſelf an operator with the apparatus major, yet could not find in his heart to diſguiſe the truth; "It muſt be acknowledged," ſays Dionis, "that while we give thoſe two ſtrokes of the dilator lengthways, and croſsways, we hear the patient redouble his cries, and cannot but be ſenſible of the pains he ſuffers, and of the propriety of refraining from the uſe of this inſtrument as much as poſſible." *

Morand had alſo been an operator with the great apparatus; but having been deputed, by the French academy, to go to England and learn the operation of Cheſſelden, it became his intereſt, after his return, to diſcloſe the ſecrets of his hoſpital, and this is the authentic and melancholy record.

Authentic liſt of the operations in the Hoſpital of La Charité.

Anno 1731,	14 *cut for the ſtone*	. . . . .	8 *died.*
1732,	11 *cut for the ſtone*	. . . . .	4 *died.*
1733,	16 *cut for the ſtone*	. . . . .	8 *died.*
1734,	17 *cut for the ſtone*	. . . . .	9 *died.*
1735,	13 *cut for the ſtone*	. . . . .	9 *died.*
Total,	71 *cut for the ſtone*		38 *died.*

Such was the iſſue of this operation when performed in La Charité, by Mareſchall, Morand, and others, the firſt maſter ſurgeons of Paris, a city where the place of hoſpital ſurgeon having been always filled by the moſt eminent anatomiſts, operations

* "Et véritablement dans le tems qu' on donne les deux coups du dilatatoire, l'un en large et l'autre en long, on entend le malade redoubler ſes cris; ce qui prouve l'exces du mal qu' il reſſent pour lors, c'eſt pourquoi on conſeille de s'en ſervir le moins qu' on pourra."

have been performed in a manner which, till the time of our great anatomiſt Cheſſelden, never had been excelled.

Who the perſon was who publiſhed the works of Collot, I know not; but he in publiſhing the hiſtory of the apparatus major, as it was found in the cloſet of old Collot, would not ſurely dare to traduce the firſt ſurgeons of France, nor obtrude upon the world untrue reports from thoſe hoſpitals in which all the ſurgeons of France had learnt and practiſed their profeſſion. He ſpeaks, in his preface, like one who had felt all the horrors of this operation, and called upon the public to witneſs the truth of his reports. "The ſmall proportion of patients," ſays the editor, "who ſurvive this operation, will render it for ever formidable! of twenty, cut by the apparatus major, not five are ſaved! and thoſe who do ſurvive paſs a melancholy life, for fiſtulas and incontinence of urine are the uſual conſequences of the inciſion."—"Look but to the books of La Charité," ſays this anonymous editor, "and you will find almoſt all the patients dying in a few days: in the year 1725, of twenty cut for the ſtone, five only ſurvived! The farther we ſearch into theſe regiſters, the more fully ſhall we be perſuaded that there is no period which is not marked with the ſame mortality, nor do the regiſters of the Hotel Dieu, afford us the ſlighteſt conſolation *."

How greatly thoſe deaths were aggravated by the manner of them, it is eaſy to conceive. The ſcene exhibited in a great hoſpital was terrible, where all kinds of dilators were at hand, and were freely uſed; where very often, as Le Dran confeſſes, the operator laboured with a degree of violence in which the ſafety of his patient was *not* the principal object, "where vanity ſuggeſted to the operator, the deſire of finiſhing his operation almoſt as ſoon as it was begun." Sometimes the operator attempted to ſucceed by ſeparating the handles of the conductors, or boring his finger between them: ſometimes by driving in the gorget through the proſtate gland: ſometimes by working with his finger in the hollow of the gorget, and turning and twiſting it, to enlarge the opening: ſometimes, by driving the forceps rudely along the cavity of the gorget, or betwixt the handles of the conductors, and, twiſt-

* "Le petit nombre de ceux qui ſurvivent à cette opération la rendra toujours redoutable; de vingt malades à peine en ſauvent ou cinque ou ſix; l'opération même ne leur laiſſe qu' une vie triſte; l'écoulement d'urine les fiſtules ſont les ſuites frequentes de l'inciſion." page 12.

In another paſſage, page 42. of the preface, the editor ſays, "Qu' on conſult les regiſtres de La Charité, on verra que preſques tous les taillez meurent dans peu de jours; en 1725, de vingt qui ſe ſont livrez à l'opération il n' en reſte que cinque! en remontant plus loin, on trouvera chaque année marquée des mêmes: malheurs l'Hotel Dieu n'offrira pas des moindres ravages."

ing, turning, and ſeparating their handles, that they alſo might ſerve as dilators. But when all failed, and the operator was forced to quit his hold of the ſtone, and uſe the proper dilator, when he made ſucceſſive ſtrokes with this inſtrument, firſt longways and then acroſs, the tortures of the patient were not to be endured, and notwithſtanding "the diviſion of this acute pain into ſo many leſſer pains," the halls of the hoſpital reſounded with his cries! Yet why ſhould I attempt to repreſent a regular ſucceſſion of dilatations or of inſtruments, ſince the inſtruments were uſed promiſcuouſly? ſince, notwithſtanding the art which ſome affected, their dilatation was one continued ſcene of confuſion and violence! Every one had his own peculiar and boaſted method of lacerating the parts. *

Let the modern lithotomiſt, if any one aſſuming the name of lithotomiſt ſhould condeſcend to read this analyſis, reflect on the cruelties of paſt times; let him aſk himſelf this queſtion, have I never performed an operation too nearly reſembling this in its defects, in its conſequences? are there no uſeful leſſons to be deduced from this relation of the cruelties committed in former ages? I fear there are few modern operations free entirely from the cruelties imputed to the apparatus major.

Firſt—let it be obſerved, that neither the paſſing down of the ſtaff into the bladder, nor any other circumſtance, can entirely ſave the urethra from the knife or forceps of a bad operator! The nick in the urethra, which ſhould be made at once, and decidedly, is often done by a timid or awkward man at ſeveral ſucceſſive ſtrokes; he cuts, lays down his knife, lifts it and cuts again; and thus, by ſucceſſive croſs-inciſions, he ſo mangles the urethra as almoſt to divide it from the proſtate gland, and render it incapable of withſtanding the puſh, even of the ſharp or cutting gorget.

Secondly—that the modern lithotomiſt, by not opening the urethra freely with the knife and by uſing a narrow bladed and conical gorget, often cuts the proſtate gland ſo imperfectly that it admits the forceps with difficulty, and in puſhing in the forceps, the mangled urethra gives way.

* The heavy work they had in dilating the parts may be underſtood by the following quotation from Pallas, who reports no more than what he had himſelf ſeen in the hoſpitals of France: "Quando adhuc ad priora impedimenta major accedit calculi moles, maxima eſt partium læſio. ad quam educendam non varo pluriam etiam brakentium hominum auxilium deſideratur." An operation ſuch as this can be likened to nothing ſo properly as the deliveries with hooks related by La Motte and other accouchemens of the laſt age, in France, who ſometimes came upon the country ſurgeons rather ſuddenly, when the crotchet being fixed into the head of the unborn child, the maſter was pulling by the hook, and the ſervants and apprentices pulling by the maſter, I have had the advantage of ſeeing ſuch *examples* both in lithotomys and accouchemens.

Thirdly—ſometimes I am perſuaded it happens, that the proſtate being thus ſevered from the urethra, in the modern, as in the ancient operation, or the gland imperfectly cut, the forceps not being properly paſſed into the bladder, are puſhed onwards betwixt the bladder and rectum, and the operator gropes for the ſtone, or actually ſeizes it in vain, the coats of the bladder being interpoſed betwixt the ſtone and forceps.

Fourthly—it is in this caſe only that the ſtone adheres. That a ſtone may adhere moſt perverſely to the bladder ſo as to be inſeparable by the power of great iron forceps, is a doctrine, which, however contemptible in the eye of reaſon, is reſpectable in point of antiquity: and the doctrine once eſtabliſhed by learned reaſonings and ſtill more learned quotations, was univerſally approved of for wiſe and uſeful purpoſes: for whoever profeſſed this doctrine could never be abaſhed, he had an apology for every miſadventure and the privilege of telling the friends and ſpectators of this operation, when the ſtone could not be extracted, that it adhered. Perhaps it will be well to declare once for all, in this place, the manifold cauſes of the adheſion of the ſtone. Among the older ſurgeons, in the time of the apparatus major, the chief cauſe of the adheſion of the ſtone was! an imperfect dilatation. And among the moderns, whenever the ſurgeon allows his ſtaff to ſlip out through the ſlit in the urethra, and lie betwixt the rectum and bladder! when he cuts the urethra ſo imperfectly, that the beak of the gorget never is admitted into the groove of the ſtaff! when, by puſhing in a wrong direction, or at too acute an angle, the beak of the gorget runs off from the groove of the ſtaff, and is lodged among the cellular ſubſtance of the rectum! when the forceps having been once in the bladder, have ſlipped from the ſtone, and been puſhed, in the ſecond attempt, betwixt the bladder and rectum! the ſtone infallibly adheres, for the bladder is betwixt the ſtone and the forceps. Theſe are, I believe, the true and veritable cauſes of the adheſion of the ſtone; before I could allow myſelf to write, in theſe terms, of a doctrine once well reſpected and as yet hardly relinquiſhed, I muſt have been reſolved, from reaſon and much experience, to treat ſo mean an apology with ſupreme contempt, as indeed it has been treated long ago even by Collot, who performed only the Marian operation. It would be difficult to ſay what kind of adheſion could ſubſiſt betwixt the human bladder and the ſtone; yet the doctrine is one which will always be held in reverence by bad operators, uncertain of the iſſue of their operations. Let them however beware of what once happened to the profeſſion. Lithotomiſts had, at one period, very nearly overſhot the mark! ſo ſtrongly had

they impreſſed this doctrine, and the fear of adheſion of the ſtone on all ranks and degrees of people, that thoſe even who were the moſt cruelly tortured with the diſeaſe, refuſed to be cut, leſt the ſtone ſhould adhere inſeparably to the bladder, and they ſuffer the pains of the operation in vain *.

Fifthly—of all the faults of the apparatus major transferred by bad operators to the operation of the preſent day, that of a limited inciſion is at once the moſt frequent and the moſt dangerous. The manner of cutting low upon the perinæum which ſhould be peculiar to the operation by the apparatus major was ſo long exhibited in public operations, that it has hardly been diſeaſed even in modern times: thoſe who had uſually ſeen the ſtone extracted by a ſmall inciſion, had not the ſpirit to deviate from the practice of the old ſchool, nor the boldneſs from principle unſupported by precedent, to make that long and deep inciſion which is alone ſafe. It is indeed to be lamented that ſurgeons do very often, like the ſons and nephews of Collot, follow the form and ſteps of a traditional operation which they have learnt and practiſed, not according to the rules of ſcience, nor by being perfectly acquainted with the deſign of the operation and the diſſection of the parts, but by imitating the motions they have ſeen performed by others! But, like the monkey imitating the operation of ſhaving, they have the ill luck ſometimes to turn their inſtruments the wrong way! Marianus and his followers made the inciſion for lithotomy, not over the hip, but along the perinæum! ſo ſometimes does the modern ſurgeon: Marianus and his followers bored in the finger along the gorget, for the purpoſe of dilating! ſo does the modern ſurgeon, though he has no ſuch purpoſe (viz. of dilating): Marianus and his ſect turned and wrought the forceps in the moſt unrelenting and cruel manner, for the purpoſe of compleating the dilatation! ſo does the modern ſurgeon, though his free inciſions ſhould enable him to refrain from this cruelty; he has indeed no deſign of dilating with the forceps, and merely performs certain manœuvres which he has ſeen practiſed by thoſe who preceded him, and which he unthinkingly imitates, without regarding the deſign or effect of what he does. Thoſe rude movements of the forceps, the moſt cruel torturing and dangerous part of the operation by the apparatus major, are continued to the preſent day; often we ſee the lithotomiſt twiſting and pulling "this way and that way,"—"çà et là," according to the expreſs directions of Paræus; it is a

* "L'idée terrible de l'adherence de la pierre, frappe et trouble-ſi cruellement les malades, que pluſieurs préferent à la lithotomie le chagrin de périr dans leurs plus cuiſantes douleurs." *Tollet.*

method mightily affected by unſkilful ſurgeons, who think to demonſtrate, to the ſpectators, the difficulties of the operation and their own dexterity and coolneſs.

If indeed modern ſurgeons were conſcious that they had not divided the parts by inciſion, but were labouring to enlarge the wound by laceration with the forceps, according to the rules of the Marian operation; if they were guided by the theory of Le Cat, of "little inciſion and much dilatation," they could not have a worthier maſter than Paræus! but a juſt and well proportioned inciſion, according to the modern theory of lithotomy, ſhould prevent all ſuch difficulties: when, at any time, you ſee an operator ſtruggling with the ſtone, turning his forceps, and twiſting his body, fixing his ſturdy feet againſt a great operation table, then wiping the ſweat from his forehead, and affecting compoſure, amidſt the cries of his patient, and the pale and haggard looks of the ſpectators! be aſſured that he is performing a Marian operation, that his inciſion is too ſmall, that he has not eſtimated the ſtone and provided for its eaſy extraction, and that the dilatation which was accompliſhed among the old lithotomiſts by appropriate inſtruments, he is attempting with the forceps. When I have witneſſed ſuch an operation I have recollected the ſcenes of the Hotel Dieu and the deſcriptions of the apparatus major, and have thought, that were Collot to riſe from the quiet grave, he would believe he ſaw the ſurgeon performing his own favourite operation, deſpiſing the method of cutting the proſtate gland, dividing the muſcles of the hip, and other novelties, which began to be obtruded upon the world about the time of his death.

BIOGRAPHICAL SKETCH

OF THE

CELEBRATED FRERE JAQUES,

AND OF

HIS OPERATIONS.

It may be eafily imagined that new and intereſting ſenſations were impreſſed upon the public mind, when, in the Hotel Dieu, where, for centuries, nothing had been exhibited but the lingering cruelties of the apparatus major, where profeſſed lithotomiſts laboured for hours, amidſt the outcries of the patient, to extract the ſtone! an operator appeared, daring beyond all belief, making light of that operation which had been regarded as the maſter-piece of ſurgery, who, without heſitation or fear, performed by inciſion what had hitherto been attempted only by the force of repeated dilatations! who boldly plunged his dagger-pointed knife into the hip, thruſt it home into the bladder, felt with it for the ſtaff, then enlarged his inciſion upwards and downwards, and in a few moments, extracted the largeſt ſtone.

Such a man was Frere Jaques, he firſt broke the ſpell of that renowned aphoriſm, which declares that wounds of membranous parts are mortal; and rouſed the learned lithotomiſts and phyſicians of Paris from their vigorous ſlumbers: though ignorant in the eyes of theſe learned phyſicians, he firſt taught them by his ſucceſs, how to explain that text of Celſus which lays it down as a ſelf-evident truth, that in operating for the ſtone, "it is ſafer to cut than to dilate."

"Of this celebrated hermit, alternately extolled by his friends and decried by his enemies, what ſhall we ſay? intrepid and fearleſs, his hand never trembled, nor did his courage faulter in the moſt unlooked for and perilous ſituations: modeſt, humble, covetous of nothing but glory, he preſented himſelf in our city, as one

ſent from heaven, to alleviate the ſufferings of his fellow creatures." * Eulogiums ſuch as theſe, pronounced by men of learning and genius, prove that he was regarded, for ages after his death, with particular reſpect; and thoſe eulogiums, repeated in all countries, mark the enthuſiaſm with which he was received. To us his friends and his enemies are alike indifferent, his diſpoſitions and his talents may now be truly eſtimated, and, to the memory of the man who invented that operation which we now prefer to all others, our profeſſion ſurely owes every mark of reſpect; nor is it a vain tribute that we pay to his memory when we enquire into the hiſtory of his life, for, from his method and the various changes it had undergone, even during his own life, may be deduced leſſons highly important to the modern ſurgeon.

"It were to be wiſhed," ſays Heiſter, "that we had a regular hiſtory of the life of this great lithotomiſt and of his proceedings."—He appeared in Paris in the month of Auguſt 1697, habited like a Recollet (a gang of mendicant barefooted friars of the third order of St. Francis) with this variation only, that in place of the ſandal of that order, he wore ſhoes, and in place of their cowl, he wore a hat: he had every appearance of ſanctity, ſimplicity, charity, and all the virtues belonging to the character which he aſſumed, and practiſed all the ſeverities of an aſcetic life: he took the name of Frere Jaques, and lived in Paris, the life of a hermit, ſubſiſting merely on bread and ſoups: he was ingenuous, modeſt, ſimple, and very poor, accepting of no other reward than a few pence to mend his ſhoes, and keep his inſtruments in repair †."

His name, he ſaid, was Jaques Beaulieu, of the village of Langſonniere, in Burgundy: that he had lived in the alms-houſe of Beſançon, where aged people and

* This elegant apoſtrophe I have tranſlated from Mauchart, who, notwithſtanding his ſcholaſtic manner and abſtruſe learning, proves himſelf a man of fervid genius. "De eo homine ermita famoſus rectum non licet ferri judicium, amicis eum tollentibus nimium adverſariis nimis elevantibus; manu ſtrenua ſtabili nec unquam intremiſcente intrepidus animo, nec ulla inexpectata re vel difficili commotus, ſobrius, ſpretor divitiarum, unius gloriæ cupidus, et quaſi miſſum a Deo ad levandas hominum miſerias ſe predicans literis commendatitiis venit Pariſios." *Mauchart*, page 315.

† "Dans le mois d'Août de l'année 1697, arriva à Paris une eſpèce de moine qui avoit l'habit de Recollet, avec cette différence ſeulement, qu'il étoit chauſſé, et qu'au lieu de capuchon il portoit un chapeau. Il ſe faiſoit appeller Frère Jaques, et il paroiſſoit ſimple et ingénu. Il étoit ſobre, ne vivant que de potage et de pain. Il n'avoit point d'argent, et ne demandoit que quelques ſols pour faire repaſſer ſes inſtrumens, ou pour faire raccommoder ſes ſouliers. Il s'étoit fait une réligion à ſa mode avec des vœux dont lui laiſſoit la liberté a ſon evêque de le diſpenſer quand il voudroit."

children are received: that there, and in various towns and villages of France, he had cut for the ſtone many times: he mentioned that he had lately travelled through the province of Burgundy, and he brought along with him many certificates of the cures he had performed. How he had learnt his operations or from whom, no one could tell; the ſecret was indeed too important to his ſucceſs to be freely diſcloſed: he reported, and it was received by the people, that he was inſpired with the gift of cutting for the ſtone; and, indeed, had he not claimed a direct inſpiration from heaven, he muſt have confeſſed ſome very humble ſource of inſtruction, for he performed other operations, and they were unfortunately the operations peculiar to quacks! Heaven had inſpired him with the talent for curing ruptures and fiſtulas, as well as that of cutting for the ſtone.

Jaques Beaulieu was, when he firſt appeared in Paris, about forty years of age; after living an irregular and idle life, he became impreſſed with the moſt ſincere ſentiments of humility and chriſtian charity; himſelf an enthuſiaſt, he had, in almoſt every city, excited the enthuſiaſm of the vulgar, who were faſcinated with his peculiar dreſs and manners, and knew no more of his hiſtory than he choſe to declare; but he could not eſcape the contempt of the learned, with whom a rude man affecting peculiar ſanctity, and pretending to inſpiration, was a character at once ſuſpicious and odious in the extreme, and every inquiry ſeemed to prove, that in courſing from city to city, and from province to province, he had the addreſs to gather up numberleſs certificates, by cutting promiſcuouſly all who offered, and leaving them again without remorſe. Such certificates were not refuſed by the friends of the patients who witneſſed only the ſingular dexterity with which he extracted the ſtone, but had he waited till the time of cure arrived, the magiſtrates of cities would not have teſtified his ſucceſs with ſo much enthuſiaſm *. He ſnatched at theſe certificates of ſucceſs, with the greedy precipitation of a quack, and often, as in Paris, while exhibiting his teſtimonials and boaſting of his cures, letters arrived declaring that his patients were all dead.

It is not to be denied that he learned his art and myſtery from a quack of the

* "Son talent étoit d'aller de ville en ville et de tailler tout ce qui ſe préſentoit, il quittoit auſſi-tôt ſes malades et les abandonnoit ſans ſe ſoucier des ſuites; et c'eſt la raiſon pourquoi il avoit tant de ceux qui avoient été préſens à l'opération, et qui pouvoient rendre temoignage de ſon addreſſe et de ſon habilité à tirer la pierre. Mais s'il eut attendu à les demander après la guériſon, ils n'auroient pas parlé avec tant d'éloge qu'ils faiſoient immédiatement après l'opération."

name of Pauloni. His parents who lived in the hamlet of Etendoue in Langſauniere, in the pariſh of Beaufort, were very poor, and he had no other education than being imperfectly taught to read and write. At the age of twenty-one years he became the ſervant of Pauloni, and followed him through France, during ſix years; when, Pauloni at length embarking for Venice, Jaques Beaulieu, either forſaken by his maſter, or unwilling to accompany him in ſuch a voyage, travelled back into his own country practiſing thoſe operations at which he had hitherto only aſſiſted.

He had thus continued long undiſtinguiſhed, by dreſs or manners, from thoſe who follow the ſame profeſſion. But about the age of forty years, he became impreſſed with the moſt enthuſiaſtic ſentiments of religion, and reſolved to devote his life to works of charity. Although not belonging regularly to any order, (or having taken vows from which his biſhop gave him a conditional diſpenſation,) he wandered over the provinces of France and arrived, at laſt, in Paris, aſſuming only the name and character of a hermit or religious man. His air of ſimplicity and piety was natural and unaffected; there are indeed appearances which a man may counterfeit, but his whole life, and he lived to ſeventy years of age, was one uninterrupted ſcene of ſelf-denial, while he gave, as is remarked by contemporary authors, continual and unequivocal proofs of his liberal and benevolent turn of mind.

After travelling through the provinces of France, he arrived at Beſançon, his native place; there he cut many poor people, with the happieſt ſucceſs, and ſome alſo of higher rank, among whom was one of the canons of the metropolitan church, who, in his zeal and affection for Frere Jaques, adviſed him to go immediately to Paris. He ſet out accordingly on this deſign, carrying with him commendatory letters from this clergyman to one of the canons of the church of Notre Dame, together with numerous certificates from the magiſtrates of the towns and provinces which he had viſited. "When he arrived in Paris he introduced himſelf at the hoſpital of La Charité, through Mr. Marechal, the firſt ſurgeon, but was grieved to find that the phyſicians of that hoſpital would not allow him to operate, though he had come to Paris with the ſole deſign of teaching a new and particular manner of cutting for the ſtone *. But the friendly canon had introduced Frere Jaques to De Harley, firſt preſident of the parliament of Paris, who became his

* Il ſe fit connoitre à La Charité par M. Marechal, premier chirurgien du roy, et trouva mauvais de ce qu'il ne vouloit pas le laiſſer tailler dans cet hôpital, etant venu exprés à Paris, diſoit il pour apprendre aux chirurgiens une maniere particuliere d'executer cette operation.

friend, and protector; and the interest of De Harley was of more avail than the introduction of Marechal.

We may observe, even from the first, a degree of reluctance, on the part of Mery, to become an impartial juror on this interesting question, whether this operator should be received into the Hotel Dieu. Frere Jaques needed a protector, such as De Harley; it was not without his express command that Mery and the surgeons of the Hotel Dieu condescended to notice the claims of this unknown operator. "I received," says Mery, "on the 7th December, an order from Monsieur the first President to attend, in the Hotel Dieu, an experiment of cutting a dead body for the stone, the stone to be put in above the pubis, the operation to be performed by Frere Jaques."

The first report presented to the Lord President, by Mr. Mery, was equally favourable to Jaques and honourable to himself; there is indeed so much zeal and warmth in his first approbation that we cannot but impute his after delinquencies, his falling off from sincerity and truth, his relapsing into his old prejudices, and continuing to practise the old operation, to the jealousies of a restless and angry set of lithotomists who seduced him and required of him a sacrifice, to which a man of spirit and honour would hardly have known how to submit; they imposed upon him the disingenuous and disgusting task of retracting his first unqualified approbation, and of inventing apologies for calumniating an operator, whom in his heart he could not but approve.

REPORT OF M. MERY UPON THE FIRST EXPERIMENT OF FRERE JAQUES, IN PARIS.

"Having introduced into the bladder a round and solid staff, without any groove * and of an unusual form; he took a common knife, remarkable only for its length,

* "Ayant introduit dans la vessie une sonde solide exactement ronde, sans rainûre, et d'une figure differente de celle des sondes, dont se servent ceux qui taillent suivant l'ancienne maniere; il prit un bistouri semblable à ceux dont on se sert ordinairement, mais plus long, avec lequel il fit une incision au côté gauche et interne de la tuberosité de l'ischium, et coupant obliquement de bas en haut, en profondant il trancha tout ce qui se trouva de parties depuis la tuberosité de l'ischium, jusqu'a sa sonde qu'il ne retira point. Son incision étant faite, il

with which he made an incifion by the fide of the left ifchium, and, cutting with it obliquely upwards, he divided all the parts betwixt the tuber ifchii and the ftaff, which he allowed to remain in the bladder: he cut fo freely upon the ftaff as to admit the finger into the bladder, along the finger he introduced an inftrument which he called his conductor, as if to dilate the wound, and along the conductor he paffed the forceps. Having introduced the forceps, he withdrew the conductor; upon finding the ftone he withdrew the ftaff alfo; and, having feized the ftone, he drew it out with all imaginable eafe, though almoft the fize of an egg."

"Upon diffecting the body," fays Mery, "in prefence of the phyficians and furgeons of the Hotel Dieu, I found, by comparing the incifion with the oppofite fide of the perinæum, that he had cut through fkin and fat about an inch and a half in thicknefs; that he had then carried his knife betwixt the accelerator and erector mufcles, without wounding either; and that he had cut laterally through the whole length of the neck and half an inch of the body of the bladder."

"Two days after this experiment," fays Mery, "I waited on my lord prefident to declare the facts, and prefent my report and judgment on the operation, and this was what I faid: It appears to me, my lord, that the operation of Frere Jaques is more favourable *with refpect to the extraction of the ftone* than that in common ufe, for a wound made thus in the neck of the bladder, will permit the ftone to pafs eafily,

pouffa fon doit par la playe dans la veffie, pour reconnoître la pierre, et aprés avoir remarqué fa fituation, il introduifit dans la veffie un inftrument, pour dilater la playe, et rendre par ce moyen la fortie de la pierre plus facile. Sur ce dilatoire qu'il apele fon conducteur, il pouffa une tenere dans la veffie, et retira auffitôt ce conducteur, et aprés avoir cherché et chargé la pierre, il retira fa fonde de l'urethre, et enfuite fa tenete avec la pierre de la veffie, par la playe: ce qu'il fit avec beaucoup de facilité, quoy que la pierre fût à peu prés de la groffeur d'un œuf de poule.

"Cette operation étant faite, je diffequay, en prefence de Meffieurs les medecins et chirurgiens de l'Hôtel-Dieu, les parties qui avoient été coupées. Par la diffection que j'en fis, et en les comparant avec les mêmes parties opofées que je diffequai auffi, nous remarquâmes que Frere Jacques avoit coupé d'abord des graiffes, environ un pouce et demi d'épaiffeur, qu'il avoit enfuite conduit fon fcalpel entre le mufcle érecteur et l'accelerateur gauche, fans les bleffer; et qu'il avoit enfin coupé le col de la veffie dans toute fa longueur par le côté, et environ demi pouce du corps même de la veffie.

Deux jours aprés cette experience j'allay chez Monfeigneur le premier prefident luy rendre conte de ce que nous avions obfervé, et luy dire mon fentiment fur l'operation de Frere Jacques. Voicy le raport que j'eus l'honneur de luy en faire.

"1° Monfeigneur, la maniere d'operer de Frere Jaques me paroît beaucoup plus avantageufe pour l'extraction de la pierre, que celle qui fé pratique ordinairement; parce que l'incifion étant faite dans le col et le corps de la veffie, et la pierre tirée par la partie la plus large de l'angle que forment les os pubis, elle peut fortir avec facilité et fans aucun éfort: mais dans l'operation ordinaire, comme on ne fait d'incifion qu'a l'urethre; que l'on tire

and, being extracted through the wideſt part of the opening of the pelvis, it will be brought along without violence: whereas, in the common operation, there being *no inciſion but in the urethra*, and the ſtone being forced through the neck of the bladder ſtill entire, and through the narroweſt part of the arch of the pelvis, the operation cannot be accompliſhed without extreme difficulty, and (wherever the ſtone is large) with great *violence*."

"The concluſion then, my lord, is plain: *That the operation of Frere Jaques muſt be leſs liable to accidents than that in common uſe.* He cuts none of the muſcles of the penis, while the inciſion of the apparatus major divides the accelerator muſcles inſtead of the rapha. His inciſion divides only the proſtate and cervix veſicæ, which are ſupplied with none but ſmaller arteries, while the inciſion of the apparatus major ſlits up the bulb, the moſt cellular part of the urethra, and that into which the chief arteries of the penis pour their blood. His inciſion cauſes neither ecchymoſis nor ſuppuration in the ſcrotum. The inciſion of the apparatus major is in the perinæum, touching the ſcrotum while Frere Jaques makes his way into the bladder by an inciſion far diſtant from the ſcrotum."

"By this long and free inciſion in the neck of the bladder, ſufficient for the eaſy extraction of the ſtone, he ſaves the patient from that contuſion and laceration of the neck of the bladder, of the proſtate, and of the urethra, which are inſeparable

la pierre par le col de la veſſie qu'on n'a point coupé, et par la partie la plus étroite de l'angle que décrivent les os pubis par leur union; il eſt viſible que par ces endroits qui ſont fort étroits, on ne peut pas tirer la pierre qu'avec de grands éforts et une extrême difficulté, pour peu qu'elle ſoit groſſe: d'où il eſt aiſé de tirer cette conſequence, que l'operation que fait Frere Jaques, pour tirer la pierre hors la veſſie, ne doit pas être ſuivie d'accidens auſſi fâcheux, que ceux qui ſuivent de l'operation ordinaire. Premierement parce que par ſa maniere particuliere d'operer, il ne coupe aucun des muſcles de la verge: mais dans la commune on ſepare enticrement les deux muſcles acceleratcurs l'un de l'autre par l'inciſion que l'on fait dans l'endroit de leur union, qui eſt le lieu de leur origine. De-là vient que ces muſcles perdent ſouvent leur action.

" 2° En faiſant ſon operation, il coupe à la verité le corps des proſtates, le col entier de la veſſie par le côté, et un peu de ſon corps; mais ces parties n'étant arroſées que par de petits vaiſſeaux, l'hœmorragie n'eſt pas tant à craindre que dans l'operation ordinaire, où l'on coupe toûjours la partie ſpongieuſe la plus épaiſſe du canal de l'urethre, dans laquelle les deux arteres de la verge déchargent une grande quantité de ſang.

" 3° Son operation ne peut pas être ſuivie ni de l'échymoſe, ni de la fluxion, ni de la ſupuration qui ſe font fort ſouvent dans les membranes des bourſes, à l'occaſion de l'operation ordinaire; parce que l'endroit par où il entre dans la veſſie, n'a pas de communication avec le ſcrotum, comme en a le perinée que coupent d'abord tous les autres lithotomiſtes.

" 4° Faiſant une longue inciſion au col et au corps de la veſſie, par la quelle il tire la pierre ſans peine, il évite la contuſion et le déchirement de ces parties, qui arrivent preſque toûjours au col de la veſſie, aux proſtates qui lui ſont jointes et à l'urethre dans l'operation commune, pour peu que la pierre ſoit groſſe & ſa ſurface ra-

from the old method. After his incision, the parts must unite more easily, and fistulas must be less frequent than in the common operation, where the violence is such that there is, from suppuration, an actual loss of substance, which endangers fistulas and prevents the cure: *whether such wounds of the neck and body of the bladder are not really fatal, as has been hitherto believed, whether the sphincter will reunite and resume its office, are questions which experience must decide.*"

This report is such as we can read with unabated pleasure, these expressions imply a zealous rational approbation, and the line of distinction is fairly, I would say irrevocably drawn, betwixt the old operation and the new! the whole manner of his harangue, before the president, does equal honour to his head and heart, to this unknown friendless man and to himself. Mery was as yet untainted with politics, he had, indeed, some lingering scruples about wounds of membranous parts; but these he seems ready to abandon, for though he was a pupil of the old school, and hardly believed, he yet seemed willing to believe, that wounds of membranous parts are not mortal.

The honour and honesty of Mery were soon and easily corrupted: If the principles of those two operations were so essentially opposite to each other, and this new method so worthy of approbation, no errors of the operator, no want of skill on the part of a man confessedly ignorant of anatomy and the common principles of our profession, no occasional deviation of his knife, should have persuaded Mery to reverse a decision so deliberately pronounced! for his approbation was founded not upon the dexterity or success of the operator, but upon the mere principles of the operation. But Mery, hurried away by the torrent of professional jealousy, was found, even before one little week had past away, acting as the instrument of a malicious party, condemning impudently the operation he had just approved, publishing malignant criticisms on the occasional errors of the operator, and, in

boteuse. De la vient que les parties qu'il divise, n'étant que coupées, peuvent plus facilement se réünir aprés son operation: d'où il suit qu'il doit y ariver moins de fistules qu'aprés l'operation ordinaire; parce que dans celle-cy les parties souffrant presque toûjours une forte contusion, il leur arrive une perte considerable de leur substance, par la supuration qui s'en fait; ce qui empêche leur réünion, et produit la fistule. Mais il me paroît, Monseigneur, que Freres Jacques pouroit entrer, comme il fait, dans la vessie, en faisant son incision deux pouces plus haut que l'endroit qu'il coupe de'abord: ce qui rendroit la playe beaucoup moins profonde, et par consequent sa guérison plus facile; supposé qu'une playe du col et du corps de la vessie ne soit pas mortelle le plus ordinairement, comme on l'a crû jusqu'icy, et que le sphincter de la vessie puisse se réünir aussi exactement qu'il étoit. Pour cela il en faut venir à l'experience."

but a little while, we find him deputed to make a public harangue in the name of the profeſſed enemies of Frere Jaques.

Thoſe lithotomiſts of Paris, and the phyſicians and ſurgeons of the Hotel Dieu who had been upon the inqueſt, did not continue long indifferent to the impreſſions made by this firſt report; new and ſeverer trials of Frere Jaques' abilities as an operator, were immediately required; and diſſections proving the dangers of this operation, and harangues, proving the incapacity of the operator, followed the firſt generous avowals of his excellent talents.

"I received," ſays Mery, "on the 14th of the ſame month of December, a ſecond order from Monſieur the firſt preſident, to attend, at the Hotel Dieu, ſome farther trials of the operation of Frere Jaques. At this time he performed two experiments: he cut upon the body of a woman, and upon the body of a boy, from twelve to fourteen years of age. The boy he cut upon the ſtaff, dividing the accelerator, which he had ſpared in his firſt operations, and he ſo lacerated the beginning of the urethra, the neck of the bladder, and part of its body behind the pubis, that the bladder was almoſt entirely ſevered from the urethra."—"But theſe injuries," ſays Mery, "might perhaps be more juſtly aſcribed to the delicacy of the parts, than to the puſhing in of his finger, though it is none of the ſlendereſt."

"On the body of the female ſubject he cut, not upon the left ſide, as uſual, but upon the right ſide cloſe by the tuber iſchii, on the apex of the hip (moignon de la feſſe), having previouſly introduced into the bladder the ſame ſtaff he was wont to uſe in men. By his inciſion, (the lower end of which was oppoſite the anus, the middle oppoſite the perinæum, and the upper end oppoſite the orifice of the vagina,) he cut the vagina entirely acroſs, and opened the bladder from the place where the ureters enter, up to the beginning of the urethra."

Theſe were ſad miſtakes: but conſiſtency was not to be expected from Frere Jaques, neither were the incorrect and careleſs inciſions of a rude operator to be imputed to the method he uſed. How could one like Frere Jaques who knew nothing of the anatomy of the parts, be correct and uniform in his inciſions? he had, in cutting the boy, almoſt ſeparated the bladder from the urethra; in the body of the woman he had wounded the vagina; he had performed lithotomy on the female, with the ſame ſtaff, and had made the ſame inciſion in the perinæum, as in man, cutting upwards from the point of the hip: all this is true, and if, on thoſe grounds, Mery choſe to retract his firſt opinion; if he choſe to avail himſelf of the argumentum ad hominem, and ſay, I have proved him a bad operator, and his operation, of

courſe, cannot be good; if he choſe to impute theſe miſtakes of the operator, to the imperfection of his method, we cannot deny his privilege; but what becomes of his firſt eulogium of all that is eſſential to this method? of his decided preference of inciſion to laceration, in ſo far, at leaſt, as belonged to the extraction of the ſtone? how has he forgotten ſo ſuddenly the deſire he expreſſed, but a few days before, of "learning, by experience, whether wounds of the membranous part of the bladder were really mortal."

Neglected in Paris, and deprived of the ſupport of the preſident Harley, by theſe machinations of profeſſional men, Frere Jaques repaired to Fontainbleau, where the court then was, and where the approbation and friendſhip of the court phyſicians, and the notice of the king himſelf, ſoon conſoled him for theſe diſappointments and enabled him, in a few months, to return to Paris in triumph. "He introduced himſelf, by letters, to Duſchene, firſt phyſician to the princes of the blood, who was delighted with his manner of operating, with his well atteſted cures, and eſpecially with his zeal, and the humane motives which had induced him to viſit the city. By Duſchene he was carried to Bourdelot, phyſician to the Ducheſs of Burgundy, to Fagon, firſt phyſician, and to Felix, body ſurgeon to Lewis XIV." While they were expreſſing the moſt earneſt deſire to ſee him perform his operation on a living body, "there fortunately preſented himſelf a ſhoe-maker's boy, of Verſailles, who lived, at that time, at Fontainbleau, cruelly afflicted with the ſtone. This boy, Duſchene, by order of the court, lodged in the houſe of a nurſe, and ordered him to be liberally ſupplied with every neceſſary: On this poor boy Frere Jaques performed his operation in preſence of Fagon, Duſchene, and Felix, and with ſuch addreſs, that they retired highly delighted with the operator, and Felix, in particular, was ſo charmed that he carried him home to his own houſe, and kept him there while the court remained at Fontainbleau"

"This operation was rumoured abroad: it muſt be acknowledged," ſays Dionis, "that this was a coup d'eſſai, moſt fortunate for Frere Jaques; the operation was rapidly performed; the boy paſſed his urine naturally ſoon after the operation; no ill ſymptom retarded the cure; and, in three weeks after the operation, he was ſeen walking in the ſtreets of the village."* Beſides this boy he cut ſix

* The biographers of Frere Jaques have all copied this narrative from Dionis, but the moſt unaccountable tradition is that propagated by the elegant tranſlator of Heiſter, who tells us, that "this boy was ſeen, in three weeks, walking about in the areas." If this be true, and it be alſo true that the boy, as was reported by many, laboured under a perpetual fiſtula, and incontinence of urine, he choſe his walks well, and would never

others at Fontainbleau, four in the hoſpital, and two in private: his addreſs and courage were loudly proclaimed by the phyſicians and ſurgeons of the royal family: the prince took a particular intereſt in the fate of the boy, the bulletin of whoſe health was daily preſented to the court, by Duſchenes; and when the lad was ſeen walking abroad again, the king was heard to ſay, "this is a man that muſt not be neglected;" orders were iſſued accordingly that Frere Jaques ſhould be lodged and maintained at his majeſty's expence.

The king now returned from Fontainbleau, to Verſailles, after an abſence of four months, and Frere Jaques approached the capital a ſecond time, ſtrong both in reputation and in friends, hated by none but the ſurgeons, ſupported by the authority of the court and the enthuſiaſm of the people, "all the world knew of what he had done at Fontainbleau, and thoſe afflicted with the ſtone were ſought after, and placed under the care of Frere Jaques as the greateſt charity and favour that could be done them."

His progreſs was rapid and enterpriſing, his ſucceſs may be eſtimated by the fury with which he was oppoſed; ten or twelve operations performed, in the city of Paris, with a degree of eclat, gave him new claims on his protector Harley, who required once more a deciſive report from the ſurgeons and phyſicians of the Hotel Dieu; this produced an extraordinary and agitating ſcene in the palace of the archbiſhop of Paris, where the great queſtion was finally and ſolemnly decided, whether Frere Jaques ſhould be received into the hoſpital to cut for the ſtone. To contemporary writers we muſt naturally appeal, not merely for facts and documents, but for their ſenſe of the machinations and profeſſional politics of the day; and we find every reaſon to believe that a plot was engendered among theſe reſtleſs men; the debate, in the archbiſhop's palace, was plainly a conteſt betwixt the friends and the enemies of Frere Jaques. "Among the mob of lithotomiſts in Paris," ſays Mr. Garengeot, "the utmoſt ſolicitude and conſternation prevailed, when they ſaw the operation of the apparatus major about to fall into utter neglect; themſelves about to become pupils to new maſters, and as pupils, not likely to be eſteemed

be out of his way. Of all the good books that have ever been mangled by ill tranſlating, Heiſter's has ſuffered moſt; for his tranſlator, though ignorant of every language, is yet ſo fond of tranſlation that he tranſlates even the names of places, and inſtead of Bois le Duc, he makes Verdun "convoy friar James to Dukes-Park;" without knowing one technical term, or the name of one inſtrument in ſurgery, he has impudently tranſlated a whole ſyſtem; and, what is more unaccountable, without improving his knowledge, either of the profeſſion or of the language of his original; for the end of his tranſlation is as ignorant as the beginning of it.

nor employed, in an operation ſo new to them, they ſtrove to weaken the favourable impreſſions made by the firſt report of Mery, and Mery himſelf was carried with them down the ſtream *. Garengeot declares, "that it was the deſign and policy of Mery to extinguiſh, though of the utmoſt importance to ſociety, the diſcovery of a harmleſs unprotected man †. Shallow policy and ſhort-ſighted! for the talents and good fortune which require ſuch meaſures are not eaſily ſubdued! Seldom has ſuch experiment been tried without raiſing the object of jealouſy to an unmerited degree of honour.'

On the 7th of April, in the year 1698, the magiſtrates of the city, the phyſicians, the ſurgeons, and the managers of the Hotel Dieu, were aſſembled, in the archbiſhop's palace, to try this cauſe; and Mery acknowledges, that it was at the requeſt of the lithotomiſts and ſurgeons, that he opened the debate. He affected to ſpeak with his wonted impartiality, but he was now the avowed head of a party: he reverſed his firſt favourable report, and retracted even his doubts, about the mortal nature of wounds in the membranous part of the bladder: he declared that he had a ſtrong perſuaſion (mais il eſt fort a craindre) that the ſphincter veſicæ once cut, will never reunite; that incontinence of urine muſt enſue; that Frere Jaques's operation, in which the knife paſſes from the hip to the bladder, by the ſide of the vagina, in woman, by the rectum in men, and cloſe to the hypogaſtric arteries in both ſexes, endangers all theſe important parts: "And the injuries of theſe parts," ſays Mery, "being ſo much more important than any that happen in the apparatus major, I leave you, gentlemen, to decide, whether this operation be not more dangerous than that in common uſe." This harangue, which began with ſome inſipid compliments, ended in the impeachment of an operation, the principles of which he had ſolemnly and deliberately approved; it was a harangue ſo violent as to lay open the deſigns of the party, and expoſe Mery to be accuſed of the moſt diſingenuous conduct. It is ſpoken of by Morand, in terms of indignation and contempt, as a ſad ſpecimen of the reſtleſs politics of that intriguing city. "We too

* "Mais une foule de lithotomiſtes, deja conſternés de voir la taille au grand appareil prèté à tomber dans l'oubli, ſe dirent qu'ils alloient devenir des ecoliers, qui pourroient bien n'etre pas les plus habiles dans cette nouvelle maniere, ni par conſequent les plus recherchés."

"Ainſi des lors on eſſaia d'affoiblir le ſuffrage de M. Mery en faveur de Frere Jaques. M. Mery lui même ſe laiſſa emporter au torrent."

† "Mais le parti etoit pris; et il falloit etouffer une decouverte nouvelle, quoique de la derniere importance, parce qu'elle etoit inventée par un homme ſans nom."

often," ſays Morand, "perceive, among men of ſcience, a ſpirit of perſecution and rancour which deadens all emulation, and from ſuch a ſpirit I have myſelf ſuffered much."

The detail of thoſe caſes I have tranſcribed on the margin *, and in Mery's comment upon them we may ſee plainly the proofs of that malice prepenſe of which he was accuſed; his pettifogging zeal had enabled him to collect together only a few idle and malicious tales, from this phyſician, and that ſurgeon! nameleſs, and treacherous men, who had been permitted by Frere Jaques to be preſent at his private operations. But with all his induſtry he was able to make out no worſe

* *Report of the Patients cut by Frere Jaques, in Paris and Verſailles.*

"After his arrival in Paris in the ſpring 1698, Frere Jaques procured many patients in private. Firſt, he went down to Verſailles, and there cut four people in La Charité, and two in private, among whom was a ſoldier of the Iriſh brigade, who having received a muſket-ſhot five years before in the bladder, the ball formed the nucleus of the ſtone. Among theſe patients was a little girl of ſeven years of age, who died on the third day, and her body was diſſected by Felix, the king's ſurgeon, and by Dionis, whom he had invited to go along with him. "We found," ſays Dionis, "that the bladder was wounded in its body near the neck, and in the vagina we found a wound the ſize of a nail, which the knife had made in paſſing by the ſide of the vagina to reach the bladder; upon obſerving this, Frere Jaques ſaid that wounds of the vagina were of very little conſequence! that he often wounded the vagina."

"La Cour partant pour Verſailles, Frère Jaques prit le chemin de Paris où ſa reputation l'avoit devancé. Il y trouva tout le monde informé de ce qu'il avoit fait à Fontainbleau, et chacun s'empreſſa de lui procurer des ſujets, croyant leur faire plaiſir que de les mettre entre les mains du Frère. M. Felix m'envoya chercher pour aller avec lui en faire l'ouverture; nous trouvames la veſſie ouverte dans ſon corps proche ſon col; c'eſt-à-dire, en l'endroit où il a coutume de l'ouvrir; nous vimes au vagin une plaie de la longueur de l'ongle, elle avoit été faite par le tranchant du biſtouri en le pouſſant le long du vagin pour aller à la veſſie. *Frère Jaques dit à cela que les plaies du vagin n'étoient d'aucune conſequence et qu'il lui arrivoit ſouvent de le percer.*"

"In Paris, about the beginning of April, before the conclave held in the archbiſhop's palace, he had operated, in private, upon eight patients: firſt, upon Madame La Lorraine, in whom he cut the vagina through and through, as I could perceive by the profuſion of blood which iſſued through the orifice of the vagina." (Mery). "And upon trying his operation myſelf, the ſame day, by order of the lord preſident, on the dead bodies of a woman and a girl, I found that I had pierced the vagina in both. Next I ſaw Frere Jaques cut a boy, of ſixteen years of age, from whom he extracted five pretty large ſtones; he ſuffered at the time, conſiderable hæmorrhage, and even on the third day, the blood continued to iſſue by the wound, the penis, and the anus; which ſhows clearly that the inteſtine was wounded. This boy *died in September, fiſtulous*, but his body was not opened. Next I ſaw him cut two men and a boy; one died of hæmorrhagy, of the other I knew nothing. Of the boy I am aſſured, by Mr. Thomas, a ſurgeon, that he has a tumor in the groin, and paſſes his urine inſenſibly, although his wound is actually cured."—"I have heard of his cutting three more in Paris; of one of theſe, a little boy, *a phyſician* who was preſent aſſured me, that, having cut the boy by the gripe, he had introduced, alternately, his ſcoop and forceps, till the boy was quite exhauſted; that two days after he died of convulſions, and, upon opening the body, the bladder was found lacerated as if with an iron comb."

accuſation than this, that of eight patients cut by Frere Jaques, two were dead, (de huit taillés qu'il a deux ſont morts trois jours après) and this with his conjectures concerning the injury done to the vagina of Madame La Lorraine, and the wounded inteſtine of the boy (vid. report in 1ſt foot-note) was all he could allege againſt Frere Jaques! but as the lady was reported alive, and the boy was reckoned againſt Frere Jaques, among the dead, Mery ſhould have ſaid no more about the rectum of the one nor the vagina of the other.

Impartial writers tell a very different tale of his ſucceſs: "Meſſrs. Dupont and Sauré (my colleagues)," ſays Garengeot, "agree with many other ſurgeons, of unqueſtionable veracity, in ſaying that they have ſeen Frere Jaques operate, not only on the ſixty patients cut in the Hotel Dieu (after this debate), but on a great many privately in the city (viz. thoſe mentioned in this report of Mery), and they aſſure me that the ſteady and deliberate manner of his inciſion, and the eaſe with which he paſſes his forceps, and immediately extracts the ſtone, without any violence, charmed all who beheld him."—"It is no wonder," ſay theſe gentlemen, "that we have, among ſo many operations, ſeen ſeveral which were followed by very diſmal conſequences; but we declare that we have ſeen by far the great number of theſe patients recover with inconceivable rapidity, and without the ſlighteſt miſchance or interruption *." While the impartial, among his countrymen, defended him from thoſe imputations, ſtrangers were not inſenſible of the malice of his rivals, and came, at laſt, to receive the many ill things reported of him with great caution. "I am ſenſible," ſays Dr. Leiſter, in his letter from Paris, "that he has got abundance of enemies, which makes me very often queſtion what I may hear ſaid of him."

At the concluſion of Mery's oration, the phyſicians, the patrons, and defenders of Frere Jaques, came forward; they acknowledged the facts detailed by Mery; they alſo acknowledge that this method of inciſion in the neck of the bladder, which had been uſed in former times, had probably been abandoned from a ſenſe of

* "De plus, Meſſieurs *Dupons et Sauré* mes confrères, et pluſieurs autres chirurgiens dignes de foi, m'ont aſſuré avoir vû tailler par *Frère Jaques*, non ſeulement une grande partie des ſoixante ſujets qu'on vient de citer, mais encore un aſſez grand nombre de perſonnes dans Paris; et m'ont certifié *que la façon delibérée avec laquelle cet opérateur travailloit, et la facilité avec laquelle il pouſſoit ſes tenettes dans la veſſie, et en retiroit promptement les pierres, ſans faire aucun effort, charmoit tous les aſſiſtans.* Il eſt vrai, m'ont ils dit auſſi, qu'ils ont été temoins de pluſieurs taillés qui ont été ſuivies d'accidens très-funeſtes, mais auſſi qu'ils en ont vû guérir une bonne partie avec une promtitude inconcevable, et ſans avoir eu le moindre accident."

its dangers. But they reminded the aſſembly, that his ſucceſſes in the provinces were well atteſted, while his miſcarriages in the city were not ſuch as juſtly to exclude him from farther trials; they declared it, as their opinion, that farther experiments ſhould be allowed, and, in the end, ſo different was the ſenſe of this aſſembly concerning his ſucceſs, from that which Mery wiſhed to impreſs upon them, that it was agreed before the meeting roſe, that Frere Jaques ſhould, during the enſuing ſeaſon, be permitted to perform the operations of La Charité and the Hotel Dieu.

Spring was come, the ſeaſon for cutting for the ſtone in France; and Frere Jaques now exhibited, on the public ſtage, with a degree of ſteadineſs, courage, and ſkill, which delighted all impartial ſpectators: but, for this temporary triumph of our operator, the ſurgeons and lithotomiſts of Paris took a deep and laſting revenge. In the month of April he began his operations, and in a few weeks had cut ſixty people of various ages for the ſtone. "He laid his patient upon the operation table, and, placing a pillow under his head, gave him to the aſſiſtants to hold, with the thighs elevated, and the heels bent towards the buttocks. He never tied his patients, as they did, in performing the more lingering operation of the apparatus major." "He made uſe," ſays Buſſire, "of a ſteel ſtaff much bigger and ſhorter than that in common uſe; it was ſhorter from the handle to the heel, where it bends more than ours, and he had but two, one for women and one for men." He introduced this ſtaff, (big, round, and having no groove,) into the bladder, and, holding it with the left hand, he preſſed it ſo againſt the perinæum, as to make that part of the bladder project, which he meant to ſtrike with the knife. Then taking in his right hand a long knife, dagger-ſhaped, he plunged it into the left hip, at the diſtance of two inches from the perinæum, and, puſhing it directly onwards, opened the body of the bladder as near as poſſible to its neck, never once withdrawing the biſtoury, till he had made an opening proportioned to the ſize of the ſtone *. He then introduced his finger to feel for the ſtone, and, running in a conductor along the finger, he introduced the forceps upon it; and, having ſeized the ſtone, pulled it coarſely out, indifferent to the effects of that violence with which it was extracted."—"Having extracted," ſays Dionis, "whatever ſtones remained

* "Puis prénant de ſa main droite un biſtouri long *fait en forme de poignard, il le plonge proche la pointe de la feſſe gauche* deux doigts loin du perinée, et *le pouſſant droit vers la région de la veſſie* il l'ouvre dans *ſon corps* le plus près de ſon col qu' il peut; il ne retire point le biſtouri qu'il ne l'ait ouverte autant que le demande la groſſeur de la pierre."

within the bladder; he cares nothing for the patient, applies neither defenſive nor aſtringent, contents himſelf with a little wine and oil for a dreſſing, and when he has been remonſtrated with concerning the neceſſary and decent care of his patient, this has been his anſwer: "I have extracted the ſtone, God will cure him."

Such was the nature of his operation, and as for the manner in which he performed it, it is ſpoken of with the higheſt applauſe. What muſt have been the feelings of admiration and thankfulneſs, when, in place of tying the patient, as for the apparatus major, in a manner more cruel by far than that now in uſe, the patient was ſimply held down upon the table? when, in place of the difficulties and delays of the apparatus major, the labouring with the dilators, the cries of the patient, and the doubts which the ſpectators endured, often for an hour, whether the ſtone could at laſt be extracted! this ignorant but dauntleſs operator, ſtruck his dagger-like knife into the hip, far from the uſual place of inciſion! moved it upwards and downwards to enlarge the wound, paſſed firſt his finger into the bladder, and then the forceps, and in a few moments extracted the ſtone, though as big as an egg? The doors of the hoſpital where he operated, were beſieged at an early hour, and ſuch was the preſs of ſpectators, that centries were required to keep back the mob; no phyſician nor ſurgeon of the city was abſent from his operations, and ſtrangers reſorted to Paris from all quarters, to ſee him operate. They were aweſtruck when they beheld him drive his knife deep into the hip, and keep it there, ſearching with the point of it for the ſtone, and enlarging the wound according to its ſize."—"There was no one who did not tremble at the dreadful manner of his inciſion, and ſurgeons, inured to operations, were altogether confounded and affected with horror, when they ſaw him keep his knife ſo long within the parts *."

I have compared and tranſlated Dionis and other authors faithfully, and cannot be deceived, in regard to the form of his poniard-ſhaped knife, or the mannner in which he ſtruck it into the hip. Leiſter, who then lived in Paris and took a particular intereſt in this operation, ſays of this operator, "He cut both by the ſmall and the great apparatus, and in both *he boldly thruſts a broad lancet or ſtilletto into the middle of the muſcles of the thigh near the anus, and plunges it till he meets the ſtaff or the ſtone.*"—"I ſaw him," ſays Leiſter, "perform the operation upon nine perſons in three quarters of an hour, very dextrouſly: he ſeemed to venture at all; and put me in ſome diſorder, and a ſtouter Engliſhman than myſelf, with

* "Il n'y avoit perſonne qui ne tremblat en le regardant opérer, et les chirurgiens mêmes quoiqu' aguéris ſur ces ſortes d'opérations étoient effrayez de lui voir tenir ſon couteau ſi long-tems dans la plaie."

the cruelty of his operation. However, I viſited them all in their beds and found them more amazed than in pain *."

Even his enemies durſt not deny that he was endowed at once with uncommon courage and preſence of mind, joined to the moſt amiable diſpoſitions. "Reports," ſays Mery, "which have come to us from various quarters, incline us to doubt the ſtory he relates of his own life; yet all the world allows him to be a man of unſubduable boldneſs; he never, in time of operation, was ſeen to faulter, or ſeem diſmayed: he has a firm and ſteady hand; never perhaps has there been ſeen a more daring operator: he is withal pious and charitable, and it were greatly to be wiſhed that ſuch a man were better inſtructed in the anatomy of the parts."

"Frere Jaques cut alſo in the ſame way in the other hoſpital, La Charité, much about the ſame time, eleven at twice. Mr. Marechal, the beſt of the ſurgeons for this operation in Paris, harangued againſt him before the governors, who coldly replied that they would be determined by the event, which was beſt."

The event was moſt diſtreſſing to his friends and favourers; his patients began to die in the hoſpital of La Charité, and Mery was employed once more in the welcome taſk of diſſecting the patients and ruining the reputation of the lithotomiſt, till he at laſt drove him out of the capital to wander over the provinces of France. Of the patients cut by Frere Jaques in La Charité, nineteen in number, eleven only ſurvived; nearly half his patients (ſeven of them) were in one day carried to the Salle des Morts †. Yet the fate of theſe patients, far from injuring the reputation of Frere Jaques, raiſed the popular enthuſiaſm to its utmoſt fervour! it was univerſally believed, that the religious who officiated in the hoſpital, mangled, in the courſe of their dreſſings, the wounds which Frere Jaques had made correctly, and actually poiſoned his patients, ſo that they died.

There are inauſpicious moments in the life of every individual, which, if he perform in public a part important to ſociety, become remarkable. The fortune of Frere Jaques was now at its criſis; ſtung with chagrin, he moſt unwiſely accuſed the monks, a vindictive ſet of men, and of powerful influence, or if he did not directly accuſe them, he was acceſſary to the report propagated by his friends, for a ſingular ſcene took place in the hoſpital of La Charité, which ſhows his imprudence. The reverend father prior of the hoſpital, when the patients of Frere Jaques

* Leiſter's Journey to Paris, p. 237.

† Il mourat à La Charité juſqu' à ſept en un même jour.

began to die ſo many in a day, ſent for Mery and Marechal to diſſect the bodies; he had the diſcretion and prudence to ſend at the ſame time for Frere Jaques, and while the anatomiſts were employed in the diſſection, the prior, turning to the friar, told him, "that it was altogether unbecoming a man of integrity or principle, to accuſe, as certainly he had done in the city, the prieſts and ſurgeons of La Charité of deſtroying the patients, by thruſting inſtruments into the bladder after this operation."

Is it to be believed that men profeſſing religion and charity, and voluntarily devoted to the care of the ſick, could be guilty of ſo unnatural a crime! of taking away the lives of fellow creatures merely to diſgrace his operation. Frere Jaques was maddened with jealouſy, and willing to allege any thing but the natural cauſes as the occaſion of his patients dying; and it was a ſure proof of declining reputation that he was reduced to an artifice ſo low as this. His patients began alſo to die in the Hotel Dieu, where there were no ſurgeons unfavourable to his cauſe, no prieſts to poiſon or deſtroy, no time indeed to meditate or commit ſuch cruelties, for very generally his patients died before the firſt dreſſing, on the third or fourth day. The report of Mery is, on this occaſion, but too true, that of the ſixty-two patients cut in both hoſpitals, twenty-five died. The proportion of deaths was ſmall indeed, compared with the mortality of the Hotel Dieu in former times; but it was ſo unexpected as to aſtoniſh the vulgar, who looked for miracles, who believed him a man peculiarly endowed by heaven with the talent of performing operations, perhaps they believed that none ſhould die. Collateral authorities agree nearly in the numbers that died: Mr. Probie an Engliſh gentleman, then in Paris, writes thus to his friend: "Frère Jaques's reputation mightily ſlackens, for of forty-five cut in the Hotel Dieu, but ſixteen ſurvive; and of nineteen cut in La Charité, only eleven ſurvive: but I am ſenſible that he has got abundance of enemies, which makes me very often queſtion what I hear; the ſurgeons have a great mind to cry down this man while they practiſe his method."

Frere Jaques wearied and diſpirited by unremitting perſecution, and affected by the death of ſo many of his patients, left Paris to travel over the provinces: by letters from Mr. Noel, we find him, in July in this year (1698) at Orleans; at Aix la Chapelle in Auguſt; and ſoon after we find him announced in the Dutch newſpapers, as Lithotomiſt to his moſt chriſtian majeſty, a title which he ventured to aſſume on the ſtrength of his certificates from the phyſicians of the court:

in the year 1699 we find him introduced in Holland, to M. De Bonrepos, then ambaſſador from France.

Whatever the buſy talents of Mery had diſcovered or invented concerning the dangers of this operation made but a ſlight impreſſion on the public mind. Marechal in Paris, Rau in Holland, and Cheſſelden in England, practiſed this operation, oppoſite as it was in its principles to that by the apparatus major which they had hitherto performed. In Holland and Germany Frere Jaques was received with the ſame enthuſiaſm as at firſt in Paris, and every where his dexterity and preſence of mind were applauded. When he ſet out from Zutphen for Amſterdam, a nobleman whom he had cured appriſed Verdun of his arrival, and requeſted that he might be reſpectfully received. "And accordingly, Guerell, chief phyſician to the hoſpital at Amſterdam, with ſeveral other perſons of merit and diſtinction, had a meeting in the houſe of the brother of this nobleman, after the arrival of Frere Jaques: they converſed with him and viewed his inſtruments; his catheter, we are told, was then without a groove, and his firſt operation in that city was performed upon a lad who was a waiter at a capital inn: at this operation were aſſembled, by order of the ſenate, the chief phyſicians of the hoſpital and city, and along with them Berengarius; and Frere Jaques performed his operation before them with ſo much ſlight and dexterity, and in ſo ſhort a time, that it raiſed an admiration in all that were preſent, and made them praiſe and extol our operator even before the ſenate *."

The excellency of Frere Jaques's operation had made a deep impreſſion on the mind of Mr. Fagon, who never ceaſed to think of him, and, being himſelf afflicted with the ſtone, reſolved ſooner or later to put himſelf into his hands; for though Marechal and all the beſt ſurgeons in France and Holland performed this new operation, and, by their acquaintance with anatomy, performed it with ſufficient ſkill; yet Fagon could not forget the bold and deciſive manner in which it was performed by Frere Jaques himſelf. He was the firſt who received Frere Jaques kindly at Verſailles: he had diſmiſſed him, even after his misfortunes in Paris, with flattering teſtimonies of his approbation: he marked his progreſs through Germany and Holland: and, in the year 1700, he recalled him to Verſailles, invited him to lodge in his own houſe, and perſuaded him to go through a complete courſe of ſtudies and diſſection.

* Heiſter.

This forms a new and interesting epoch in the life of this extraordinary man, who, after being long an operator, submitted to the discipline of the schools, and, by studying under the greatest masters, added to his natural talents and address a knowledge of the parts.

Many a fool, affecting indifference to the natural fear of death, has blazoned his folly by building himself a tomb or placing his coffin in his bed-chamber: but Fagon, from manly and sensible motives, did what denotes to me greater firmness of purpose! He accompanied Frere Jaques through a suit of dissections with a continual reference to the operation which he was himself to suffer, and witnessed, in living subjects, in the hospital of Versailles, experiments in that operation, the casualties of which might deprive himself of life. Frere Jaques was made first to operate on dead bodies, the parts being dissected by Du Verney, and then the peculiar dangers of his operation, so plainly superior to every other, were impartially discussed: Every thing dangerous was next corrected, and the necessary improvements explained to Frere Jaques, who received at once the lessons of Du Verney, the most celebrated anatomist, of Felix, the king's body surgeon, and of Fagon, his future patient and his friend. It was finally resolved that he should operate, in future, with a grooved staff, and with this corrected instrument he renewed his experiments, which were soon declared by Du Verney to be complete. With this improved staff and corrected operation, he cut thirty-eight patients in Versailles, as is proved by the certificates of Bourdelot, Boudin, and Gervais, surgeons in ordinary, without losing one. This was the secret of all his after-successes; for, when Frere Jaques passed again into Holland and Germany, he cut with astonishing success; no ill reports followed him as in his first career. "Ferhius, a Swiss physician," (who published a thesis, anno 1716,) says, "that of sixteen lately cut by Frere Jaques, in Strasburgh, one only died, and that an old man, whose death was predicted from his age and weakness." Frere Jaques while operating in that city, whispered Salzmanus in the ear, "that he had left off his rude way of operating, and now used a grooved staff." Weisbachius testifies that he had seen Frere Jaques cut twenty for the stone, in Strasburgh, of which hardly one miscarried, but were all cured presently without fistula or any other distress.

Never were any lessons of men of science more successful than these of Fagon and Du Verney, nor received with more modesty and thankfulness by any artist. He would teach well, and diligently! who was to reap, so immediately, the fruit of his own labours. Frere Jaques, in a little memoir which he wrote in defence of

his reputation, mentions his gratitude to Fagon in the following terms: * "Frere Jaques had obſerved that the dangers and injuries connected with this operation, proceed chiefly from the wounding of the root of the penis, where its cavernous bodies join, and that to avoid theſe dangers the inciſion ſhould be made in the neck of the bladder; and having of late introduced himſelf to Meſſrs. Fagon and Felix, the king's phyſician and ſurgeon, and performed many operations before them, upon both dead and living bodies, they were perſuaded that the operation was in itſelf good, ſuperior to the old operation, and requiring chiefly to be improved in reſpect of the inſtruments; and they thought that a good grooved catheter ſhould be uſed to inſure the place of the wound. Frere Jaques has reformed all this, has continued to practiſe this improved operation on the living as well as on the dead body, for four years, and has not neglected to obſerve other points in which his operation might be improved both in reſpect of the inſtruments and of the inciſion. Having been often examined by Meſſrs. Fagon and Felix, and the other ſurgeons of the court; having performed many experiments in their preſence, both on the dead body and on the living, theſe gentlemen, regarding his operation as very valuable to the public, have been pleaſed to grant their approbation which has been ſeconded zealouſly by the mayors, ſheriffs, and governors, of the various cities and provinces of France." The ſurgeons of the court had, indeed, behaved in the moſt liberal manner: they procured him paſſports from the court: they gave him the moſt unqualified certificates of his ſuperior ſkill and courage: they bore witneſs to his charitable and diſintereſted conduct, and to the perfect ſucceſs of every operation performed in their preſence: they aſcribed his ſucceſs to the improvements in his operation, to his ſkill lately acquired in anatomy, and to his uſing a grooved ſtaff, from the groove of which he never moved his knife till the inciſion in the neck of the bladder was complete. Nor was it from the court phyſicians only that he obtained thoſe teſtimonials of his ſucceſs; but from all the ſurgeons of Verſailles; they gave it under their hands "that he had cut thirty-eight patients in the hoſpital with uniform good fortune." How different this from the invidious conduct of Mery, of whom Frere Jaques complains, but ſtill with modeſty and candour. "Of hundreds of healthy ſubjects cut after this improved method," ſays Frere Jaques, "none had died or remained fiſtulous, though Meſſrs. Mery and Saviard, maſter ſurgeons, have ſo affirmed in their writings,

* The Memoir was anonymous; Frere Jaques therefore writes in the third perſon.

and have circulated thoſe writings with ſuch diligence, in all the provinces, as to impreſs the people with the moſt unfavourable opinion of him, which is indeed his chief reaſon for writing theſe few papers to undeceive the world."— "Why," ſays Frere Jaques, "ſhould Mr. Mery declare this method good in itſelf and requiring no other reform than that of cutting upon a grooved ſtaff, without waiting the iſſue of that improvement which he had himſelf adviſed? without expecting impartially the reſult of future experiments? But indeed Mr. Mery takes a pleaſure, not in aſſiſting but in blaming the operator, and in accuſing him of cutting the ſpermatic veſſels in thoſe he pretends to cure of the rupture, and he takes particular delight in likening him to one Raoult, whom he calls a mountebank and rogue. But in truth Frere Jaques, during thirty years that he has practiſed this operation, though he has operated on four thouſand five hundred patients afflicted with the ſtone, has beguiled no one, nor ever operated but in preſence of phyſicians and ſurgeons and by their conſent and advice *."

There were, at this moment, two men of eminent rank who had reſolved to ſubmit to the operation of Frere Jaques, the one Mr. Fagon, firſt phyſician to Lewis XIV. the other the Mareſchal de Lorges: both had taken meaſures to enſure the ſucceſs of the operation, but, in the very moment that Frere Jaques was about to attain the moſt diſtinguiſhed honour, he ſuffered a ſad reverſe of fortune. Mr. Fagon had himſelf taught Frere Jaques, and with the aſſiſtance of Du Verney, the celebrated anatomiſt, and Felix, firſt ſurgeon to the king, had made him go through a ſeries of diſſections: His operation was reformed according to their deſire, he had forſaken his big round ſtaff, and cut upon a grooved one; he had operated on thirty patients in the Hotel Dieu, of Verſailles, with uninterrupted ſucceſs: he had already ſounded Fagon, and felt the ſtone, yet Fagon, though thus far advanced in this generous deſign, was prevailed on, by the ſolicitation of his friends, to put himſelf into the hands of Marechal, who had learnt to perform Frere Jaques's operation. Marechal accordingly performed the operation, and Fagon ſurvived, and in a few weeks went abroad in his carriage.

The Mareſchal de Lorges, of diſtinguiſhed rank and great fortune, proceeded with equal precaution; he aſſembled in his hotel twenty-two poor people afflicted

* Vide Frere Jaques's Memoir in defence of himſelf, in compoſing which he probably had the aſſiſtance of Hanault and the advice of Fagon, Felix, and his other friends; for Hanault took a particular affection for Frere Jaques, conſulted with him about the means of improving the operation, and promiſed to defend him from the inſolences of Mery.

with the ſtone, who were cut by Frere Jaques with perfect ſucceſs; but while the poor patients ſurvived, the Mareſchal himſelf died in tortures the day following the operation. This was deciſive of the fate of our operator; the Mareſchal de Lorges lying dead in his ſuperb hotel, while Fagon, cut by M. Marechal, was rolling in his chariot in the ſtreets of Paris, was a triumph for the regular lithotomiſts and a mortal blow to the reputation of Frere Jaques, who now departed from Paris never to return.

Whatever judgment we may be inclined to form of this extraordinary man, we owe to his memory this ſimple reſpect, viz. of tracing his future courſe, till his arrival in his native village, where he reſolved to end, in poverty and obſcurity, a life ſpent in deeds of charity.

After leaving Paris he continued to travel for many years, over the provinces of France, Holland, Switzerland, Germany, and Italy; there was no country, except our own, in which he had not appeared. He was firſt invited by the ſenate of Geneva, to viſit their republic, he cut five patients in the city and two in the adjacent villages, and received the public thanks of both the greater and leſſer council. In the year 1704 he was earneſtly ſolicited to viſit the city of Amſterdam, where he arrived in the month of July, and by permiſſion of the magiſtrates cut numbers in the hoſpitals of that city. He ſtill preſerved the character and outward ſigns of ſanctity, charity, and ſimplicity of life: he was followed by the people with enthuſiaſm, and regarded even by thoſe of better education, as one ſent from heaven. But "Rau publiſhed journals of the ſucceſs which the operation had upon thoſe who were cut by the French Lithotomiſt; which proceedings being laid open, demoliſhed his reputation, ſo as to make him leave the place, in which office Rau was happily employed with very great applauſe, and retained till his death *." Thus were the politics of Paris received in Amſterdam, but when the place of city-lithotomiſt was beſtowed on Rau, ſuch tumults aroſe in the city that the magiſtrates were obliged to expreſs, in a public manner, the gratitude of the people by conferring an honorary reward on Frere Jaques †. At Delft, Utrecht, Leyden, and the Hague, he had equal ſucceſs; and on his viſiting the latter city, the

* Heiſter.

† They had his portrait engraved, the prieſt in his religious habit; in the diſtance was a hermitage; above it was written, "Ægri quia non omnes convaleſcunt, non idcirco nulla medicina eſt;" and below was written, "FRATER JACOBUS DE BEAULIEU, ANCHORETTA BURGUNDUS LITHOTOMUS, OMNIUM PERITISSIMUS."

magiſtrates had his portrait engraved anew, and preſented him with a ſet of golden ſounds.

Rau, whoſe rare talents and incomparable meanneſs of diſpoſition kept an almoſt equal pace, ſo that we know not whether moſt to admire or deteſt the man, publiſhed, like Mery, his daily ſcandals, and diſſected Frere Jaques out of the capital of Holland! and yet he ſtole the very operation which he affected to condemn. But it was neither the treachery of Rau nor the unfavourable deciſion of the magiſtrates of Amſterdam that drove Frere Jaques out of the city, it was his own reſtleſs deſire to travel. Having traverſed Holland, he went to Angers, then to Bruſſels, and in that city received, as the laſt teſtimony of the gratitude of Amſterdam, a letter from the ſenate expreſſing their reſpect, and a medal bearing the arms of the city, a crown encircled with a wreath of oak, and the inſcription, "*Ob cives ſervatos.*" He was even intreated by his private friends to return, and the modeſty and humility of his reply deſerves to be recorded. "Why ſhould I return to your city when you have already a man ſo much above me, as Rau?"

In the year 1707 he appeared again in France; and, in his way to Lyons and the ſouthern provinces, ſtopped at Verſailles to viſit Fagon, who received him with much kindneſs, and would have loaded him with preſents, which he refuſed with great conſtancy, accepting only new certificates of his approbation and friendſhip, and paſſports from the court, for travelling in the ſouthern provinces. He arrived at Lyons in the ſpring 1709, from thence he was called again to Geneva; from Geneva he was called to Nancy, by the Duke of Lorrain, to cut one of his principal officers for the ſtone: and was prevailed on by the prince to remain in his ſtates all that ſpring, and ſummer: During this ſeaſon he cut eight patients ſucceſsfully. He was next called to Liege, and there paſſed the winter of 1711. In the year 1712 he went to Straſbourg, and there it was that he whiſpered Salzmanus that he had reformed his operation and uſed a grooved ſtaff; in Straſbourg he cut ſixteen perſons for the ſtone, loſing only one diſeaſed old man. Such was at this time the reputation of Frere Jaques, that while the invidious group of lithotomiſts in Paris believed him loſt and neglected in ſome of the remote provinces, he was actually at the Court of Vienna, at the requeſt of the Emperor Charles Joſeph, whom he viſited for ſeveral days along with his ſurgeons and phyſicians, but the Emperor's diſeaſe was not of the nature that was ſuſpected when Frere Jaques was ſent for, and he was accordingly diſmiſſed with honourable preſents. In April 1713 he departed

for Venice, from thence he went to Padua, where he cut ſucceſsfully, and thence he went to Rome to receive the benediction of His Holineſs.

Wearied at length of travelling * and deſirous of viſiting his own country before he died, he left Rome and never ſtopped till he arrived in his native village, where, of all his relations, he found only ſome of his nephews alive. Having diſtributed among thoſe poor relations the little money that remained to him, he retired to Beſançon, where he lived long, and died much advanced in years: he was buried in his native village, in the church of St. John, from the regiſter of which Morand extracted the memorial of his interment. The medal preſented by the city of Amſterdam was never found! The golden ſounds he was known to have melted down before he died.

On reviewing what I have written of the life of this remarkable man, I feel loath to record ſuch uncharitable perſecutions, of one who ſpent his whole life in deeds of charity, who while he had it in his power to become rich, died in poverty, perhaps in want. Let us judge now according to his deeds: a man who, while alive, "was extravagantly extolled by friends and traduced by adverſaries," and was, as Heiſter ſays, "the ſubject of every one's thoughts and diſcourſe," of whom this at laſt muſt be acknowledged that through the various ſtages of a long and uſeful life, he proved himſelf a perſon of unfeigned ſimplicity and goodneſs.

He chanced to appear in a country full of empyrics of the loweſt claſs, and in an age when a jealous profeſſion was ſtriving to regain its privileges: he appeared as a mendicant friar profeſſing ſanctity, living on charity, and pretending a peculiar call from heaven to cut for the ſtone: his certificates gathered up in haſte, ſerved only the needy purpoſes of quackery! for he was chiefly concerned about the ſpeedy extraction of the ſtone, leaving the cure of his patient to heaven. His advertiſements were ſtuck up, on the gates of cities, and in courſing from province to province he contrived to outrun the rumours of his ill ſucceſs.

This man was, by a happy ignorance, puſhed on to make theſe inciſions in the body of the bladder, which phyſicians believed to be mortal; it was through the favour of the court, and the fanaticiſm of the people, that he was enabled to oppoſe a whole profeſſion, and permitted to operate in the hoſpitals of Paris, Verſailles,

* How many years he continued to travel is not abſolutely known, for while Morand cloſes his career in the June 1714, Heiſter aſſures us on the authority of private letters from the ſurgeon Verdun, that he had ſeen him perform his operation at Straſbourg in the year 1715; and we are told by Le Maire, his countryman, that he died at Beſançon, ſeventy years of age.

Strafbourgh, and Amfterdam: But the enthufiafm created by his new and daring manner of operating, foon expired; his patients died apace; his operation was critically examined by men fkilful in anatomy, and it was not thought advifable that a man fo ignorant, fo adventurous, performing his incifions in fo unguarded a manner, fhould be preferred to the regular lithotomifts of France and Holland.

At firft he was nothing but a bold and fearlefs operator, his courage being excited by enthufiafm, and nothing qualified by any knowledge of the parts or forefight of danger! He cut with all the audacious ignorance of a quack, fometimes high, fometimes low, fometimes in the body of the bladder, fometimes in the neck, fometimes upon the gripe, fometimes upon the ftaff! and in women he made his incifions in the perinæum exactly as in men: often he transfixed the bladder with his dagger-fhaped knife, or, miffing the bladder, ftruck his knife repeatedly into the hip, mangling the parts with tranfverfe incifions.

Yet there was in his peculiar manner of operating, that which reconciled men of fcience to his rudenefs, and in his actual operations there was fo much boldnefs, felf-poffeffion, and peculiar addrefs, as made them think it a charity towards mankind to inftruct him in the difficulties and dangers of his own operation! "Never," fay contemporary authors, "has there been feen a more dextrous operator; the fpectators tremble at the manner of his operation, when he ftrikes his knife into the hip, and remain in breathlefs expectation, while he holds it there and fearches with it for the ftone, which he extracts to the amazement of all beholders." "He was a man," as the king had faid, "not to be neglected, nor was his operation to be loft."

But Frere Jaques, after having received the inftructions of Du Verney and Felix, and having lived in the houfe of Fagon; when he had reformed every ftep of his operation and accuftomed himfelf to cut upon a grooved ftaff, performed an operation inferior to none practifed fince his time! He now was as fkilful as he had at firft been bold and fearlefs, and he had this peculiar happinefs, that he was the very operator that France, or rather all Europe required, and his courfe of life was fuch as enabled him to do infinite fervices to his fellow creatures. The ftone, from low living and uncleanlinefs, was, over all Europe, but moft efpecially in France, a very frequent difeafe; his motives for devoting himfelf to this operation were very ftrong, and they are expreffed in his memoir, in a fimple and ingenuous manner. "The mayors, fheriffs, governors of provinces, have witneffed that dexterity and fteadinefs

with which nature and long experience hath endowed him; and they have alſo witneſſed the zeal, piety, and charity with which he hath conducted himſelf, receiving preſents from the rich only to give to the poor. But knowing, or fearing, that this would in the end be unto him an occaſion of ſin, he hath renounced all worldly goods by his vow, and given himſelf up to the ſervice of thoſe who are afflicted with the ſtone; the rich, when they ſend for him to diſtant provinces, bear the expences of his journey, and the charity they themſelves perform according to their hearts. Having obſerved the numbers afflicted with the ſtone in the various provinces of the kingdom, many of whom die from being unable either to ſend for one dextrous in ſuch operations or to have themſelves conveyed to any great city, ſuch as Paris, to be cut there; having remarked alſo that the ſurgeons in the country parts have uſually declined this operation, as difficult and full of danger; and it being for the public good that there ſhould be able lithotomiſts in the provinces, Frere Jaques has forſaken his family, abandoned all other operations, and applied himſelf ſolely and with much diligence to this operation."

"It appears ſufficiently," ſays Douglaſs, "from many particulars of his hiſtory, that Frere Jaques muſt have been a moſt profligate abandoned wretch." Never, I believe, was there a human creature leſs deſerving theſe epithets *. We are, on the contrary, pleaſed to find reſting on the mind, a reſpectful opinion of a man born in the loweſt ſituation in life, but with good talents and worthy ſentiments, and to whom our profeſſion owes the diſcovery of that operation which we now perform. From his time the ineffectual cruelties of the apparatus major were abandoned, and his operation univerſally received; even thoſe of the old faith who affected to perform the great operation, had their ſly coup-de-maître, which they durſt not avow; Rau, the celebrated Rau, learned his operation from Frere Jaques, and continued, during all his life, to conceal a diſcovery in which he had no right nor property, which he had learnt from an itinerant operator whom he affected to deſpiſe and conſpired to ruin.

* The man who wrote ſuch language muſt have had an unfeeling heart, but he who proved a crime by the following jeſuitical conſtruction of the ſecret ſentiments of one long dead, muſt have had a depraved one. "He muſt," ſays Douglaſs, "have been a moſt profligate abandoned wretch, and that, under an *outward* air of ſimplicity and ſel-fdenial, he concealed ſome *ſecret deſign or other*, which *perhaps* the multitude of perſons that died under his hands, prevented his ever putting it in execution." *Douglaſs*, page 28. If a man is guilty or ſuſpected of no crimes but thoſe which he never puts in execution, he might reaſonably enough expect to eſcape calumny.

ANATOMY OF THE OPERATION OF FRERE JAQUES.

Whatever in this operation is either creditable to the inventor or uſeful to poſterity, whatever circumſtances in his general method, or in his individual attempts, may ſerve as leſſons to the modern lithotomiſt, will be beſt underſtood by comparing his inciſions with the anatomy of the parts. He performed a daring inciſion by no rule: he operated with a round ſtaff or with a tubulated catheter: he operated, as Heiſter informs us, often with a pointed table-knife. "I myſelf," ſays Heiſter, "have heard the Dutch people ſay, while I was in Holland, that when our lithotomiſt came hither from France, he at firſt cut a number for the ſtone, and would ſometimes uſe a common blunt knife, to perform the operation, when his own inciſion knife was not at hand *." The manner in which he performed his inciſion was, by plunging this dagger-ſhaped knife into the point of the hip (la moignon de la feſſe): † The intereſt excited by his manner of operating, amounted actually to enthuſiaſm: In place of the tedious and ineffectual dilatations of the apparatus major, this fearleſs man was ſeen to plunge his dagger into the bladder at once, and almoſt inſtantly extract the ſtone. The eſſential of his operation was, that it ſubſtituted inciſion to dilatation, and gave the lie to the renowned aphoriſm which proteſts that "wounds of membranous parts are mortal."

My reader is, I believe, prepared to attribute every thing good and uſeful to the method itſelf! every thing irregular, dangerous, and diſaſtrous to the faults of the operator. He is alſo prepared to diſtinguiſh the rude inciſions performed at firſt by this bold but ignorant man, from the maſterly operation taught him by Du Verney and Fagon; for the operation which he was then taught forms a period in his life hitherto unnoticed, and an æra in our ſcience:—FIRST, Frere Jaques either remarked himſelf, or was taught by others to obſerve, the chief errors of the ap-

* And in another place he ſays, "He uſed a common knife like that which we uſe to our victuals." The table-knife of France and Holland was a long ſharp-pointed claſp-knife.

† "Il tenoit dans cette inciſion, une autre route que Frere Jacques; car cet hermite pouſſoit, en aveugle, un poignard obliquement de la partie interne de la tubéroſité de l'iſchion, juſques dans la veſſie; et quand cet inſtrument meurtrier n'enfiloit pas la vraïe route, il en arrivoit les déſordres que nous avons détaillés." Garengeot, page 192.

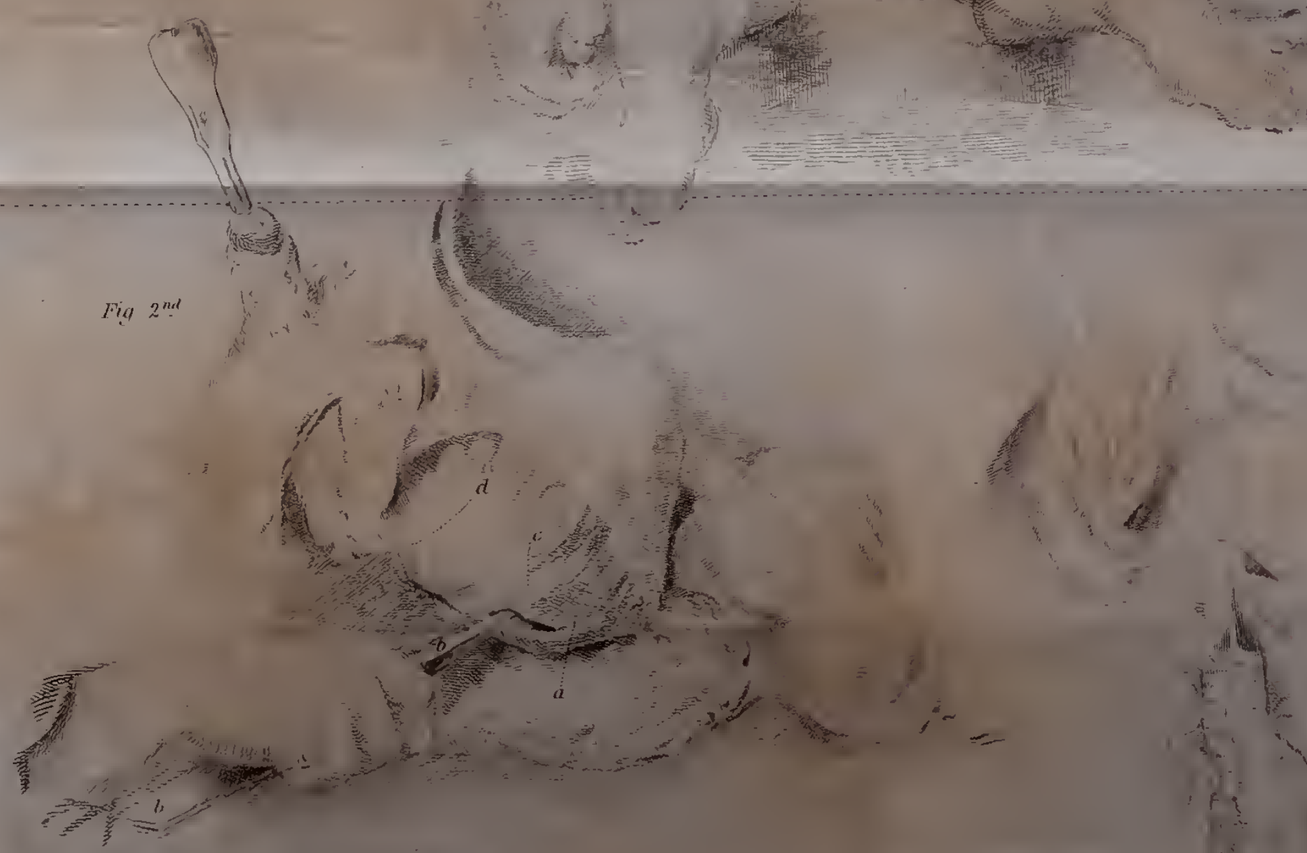

Figure 3d shows how a rude Operator might by a desperate plunge touch the Pubis

Figure 6th illustrates the same point as Figure 5th

paratus major: he was aware that the great miſtake was, making the wound in the perinæum over the root of the penis, and not in the hip, over the neck and body of the bladder, for in his own vindication he ſays, "Frere Jaques had remarked that the dangers and injuries of the old inciſion proceeded chiefly from the wounding of the root of the penis, where its cavernous bodies join; and that to avoid theſe dangers the inciſion ſhould be made in the neck of the bladder:" Behold here the motive for making his inciſion in the hip, and ſuch an inciſion muſt have had all poſſible facilities and muſt eſpecially have enſured the expeditious extraction of the ſtone: The apex of the hip is the tuberoſity of the iſchium! When Frere Jaques ſtruck his knife by the ſide of the tuber iſchii, he opened that great hollow which was left cloſed by its muſcles in the inciſion of the apparatus minor! and the dividing of thoſe muſcles is eſſential (whatever way the operation is performed) to the eaſy extraction of the ſtone. By ſtriking the knife by the ſide of the tuber iſchii he divided the tranſverſe muſcle: by moving the knife ever ſo little, to enlarge the wound upwards and downwards, he cut all the muſcles entirely acroſs, and opened ſo completely the great hollow, that every reſiſtance on the part of the perinæum was removed.—This praiſe of dividing all the muſcles, even the enemies of this operation allow him. Mery was ſurpriſed into a favourable report; "His inciſion," ſays Mery, "proceeds in the middle line, betwixt the accelerator urinæ and erector penis, without wounding either, and opens all the neck of the bladder and half an inch of its body." The figure (fig 1.) which I have ſketched to illuſtrate this point, is moſt important; it is applicable to every ſpecies of lithotomy; it is a plan of thoſe muſcles of the perinæum of which I have already given a correct drawing; it ſhews the penis thrown back over the lower part of the belly; the groins much ſtretched as in lithotomy; the ſcrotum ſtrongly corrugated; and the dotted lines mark that triangle in which the inciſion is to be performed. The ſurgeon muſt remember that this triangle is bounded by the two legs or branches of the os pubis; that the crura penis ariſing from theſe branches lie along the ſides of the triangle; that the erectores penis muſcles, marked by the dotted lines (b b), lie upon the roots of the crura penis; that the bulb of the urethra, lying immediately under the middle of the arch of the pubis, occupies all the perinæum from the ſcrotum to the anus; that on the bulb lies the accelerator urinæ muſcle, marked by the dotted line (c); that the great hollow under the tuber iſchii, the center of this opening of the pelvis, and the only ſpace through which the ſtone can be extracted, is croſſed by the Tranſverſalis Perinæi, marked by the dotted lines (d d); and that Frere Jaques's

incifion is the true incifion of lithotomy: firft, becaufe it cuts the tranfverfalis perinæi acrofs and does away all refiftance on the part of the mufcles: fecondly, becaufe it completely opens that hollow place by the fide of the rectum in which the cervix veficæ lies and through which the ftone muft pafs. The line of Frere Jaques's incifion is defignated by the dotted line (e); and it is feen that the line of incifion turns over the hip, and that as much of it is behind the anus, or in other words, behind the tranfverfe mufcle, as before it; and that fuch a wound whether made by a ftab as by Frere Jaques, or by, firft, a fuperficial incifion, and then a flow diffection as in our manner of operating, is ftill the true incifion of lithotomy: Let the furgeon keep thefe points in mind, and compare this fcheme with that which accompanies the operation of the apparatus major.

Secondly,—Why Frere Jaques did not ufe a grooved ftaff, and how he could ufe a round one, is matter of difficulty and furprife to many who have defcribed his operation; the defcription of this part of his operation involves fingular confequences, and is the theory of all his mifconduct, for he did not penetrate, as we do, by a gradual diffection, ftopping upon the face of a grooved ftaff, but ftruck his knife at once into the bladder; he went beyond the ftaff till the point of the knife paffed the bending part of the ftaff and the blade lay acrofs it; as he did not cut upon the face of his ftaff, the ftaff was not grooved; as he cut in the bend of his ftaff it was remarkably curved at the heel; his knife, when he ftruck it into the cavity of the bladder, paffed through what is called the body of the bladder clofe behind the proftate gland; and when he drew it towards him to complete his incifion, he opened the neck of the bladder and the proftate.—This is an unthought-of manner of acomplifhing the internal incifion; viz. cutting along the bend or concave of the ftaff. Figure 2. illuftrates this incifion, where the ftaff (a) is feen to have a prominent heel and a bold curve; where the dagger-fhaped knife (b) is laid acrofs the bend of the ftaff; where the portion (c) of the knife, that is within the bladder, lies in fuch a direction, that, being retracted in the direction of the dotted line (d), it cuts up the whole length of the neck of the bladder, and the whole of the proftate.

Thirdly,—It is matter of furprife how, with a ftaff thus paffed into the bladder, he could cut the urethra entirely away, or how, the operation being effentially good, fuch difmal confequences could enfue from his irregular incifions. Morand confeffes that he is altogether at a lofs to imagine how he could divide the arteries going to the root of the penis, or occafion ecchymofis behind the pubis, and extravafation of blood within the abdomen. The truth is that the incifions of Frere

Jaques, in his firſt operations, were as irregular and dangerous as his inciſions in his latter operations were correct and ſure. His firſt operation was rude, unguarded, performed upon a big round ſtaff, it was a ſtab with his dagger-pointed knife, bold and ſucceſsful, in ſo far as regarded the extraction of the ſtone, but diſmal in its conſequences as it related to the fate of the patient; in this operation he ſtruck at once into the body of the bladder, and his knife was ſtopped only by encountering the ſtone. His ſecond operation, taught him by Du Verney, Fagon, and Hunauld, was performed by ſucceſſive inciſions, like thoſe of the modern lithotomiſt, by which he cut towards his ſtaff: he opened not the body of the bladder, but the proſtate; his knife never entered into the bladder, but was ſtopped by the groove of the ſtaff; it was by running the knife along this groove that he ſlit up the gland and cervix veſicæ.

Let us then obſerve the effects of thoſe two inciſions.

ACCIDENTS OF FRERE JAQUES'S ORIGINAL AND UNCORRECTED OPERATION.

To the unremitting, I had almoſt ſaid the unrelenting labours of Mery, we owe an ample catalogue of the errors which were or might be committed in performing this operation; and there is not one of the uſual misfortunes of Frere Jaques's practice that may not be referred to his thus paſſing his knife over the bend of the ſtaff.

First,—In ſtriking in his knife, the diſtance being great betwixt the hip and the bladder, he often miſſed his way and mangled the parts by ſucceſſive ſtrokes. In our modern way of operating we go on by a ſlow and gradual diſſection, becauſe we know the parts! we cut from above downwards, and carry the point of the fore-finger of the left hand before the knife, while we are diſſecting with the right! we preſs aſide the rectum till, in the courſe of diſſection, the knife reaches the bladder ſafely: He, on the contrary, cut from below upwards, ſtriking his knife at once into the bladder, and his knife in his more fortunate operations glided ſafely by the ſide of the rectum, to that part of the body of the bladder which lies upon it: but when he deviated from the true direction, his knife wounded the rectum in paſſing; this wound, as it cauſed an iſſue of fæces and often a fiſtulous ſore, he was not willing to acknowledge. In operating on women, his knife wounded the vagina, and blood flowed from its orifice; but as this was not a mortal nor even a

ſiſtulous wound, he ſpoke of it very ſlightly and ſaid, " he often wounded the vagina." When, in place of deviating towards the ſide of the rectum or vagina, his knife glanced upon the bone, it there wounded the great pudic artery, the patient then bled profuſely, and ſometimes died; for his knife paſſed, of neceſſity, betwixt the rectum and the pudic artery, which are but narrow limits for a rude operator unacquainted with anatomy.

Secondly,—In drawing back his knife by which he completed the inciſion of the proſtate; his knife, being turned acroſs the bend of the catheter, ſometimes projected too far, and transfixed the oppoſite ſide of the gland; upon being retracted, it ſlit up the gland, and membranous part of the urethra on both ſides; and in turning over the round catheter at the end of the inciſion, cut the little of the urethra that remained undivided: thus it often was found, upon diſſection, that he had cut the urethra fairly off from the neck of the bladder, and it was ſhrewdly ſuſpected that where he had only weakened the urethra by this circular inciſion, he completed the ſeparation of it by puſhing againſt the gland with his clumſy finger, or with a conductor, for he often uſed one. Theſe are warnings then to the modern lithotomiſt, in whoſe operation the ſame accidents happen by moving the knife with a circular motion, or by cutting the urethra by ſucceſſive ſtrokes. This poſture of the knife laid acroſs the bend of the ſtaff, and transfixing the bladder near the neck, is illuſtrated by fig. 5. where it is very obvious, that in the retraction of the knife from (a) to (b), the urethra will be ſlit up on both ſides, and very little of it left to connect it with the bladder; but if towards the end of the inciſion, the point (c) of the knife was raiſed ever ſo little, and the heel (d) carried round under the catheter, the urethra would be entirely divided.

Thirdly,—It muſt be remarked that Frere Jaques knew that he had ſtruck his knife into the bladder, only by the urine flowing off: the moment the urine flowed off, the bladder was contracted round the knife and the ſtone: the patient is, during this moment of acute pain, irreſiſtibly inclined to preſs, as if diſcharging his urine, and the mere contraction of the bladder, much more the preſſure of the abdominal muſcles, puſhing down the viſcera from above, muſt preſs the fundus of the bladder againſt the knife! thence every motion of the knife, in ſuch a condition of the parts, muſt have been dangerous. The original operation of Frere Jaques, and of his maſter, Pauloni, was that by the apparatus minor; this operation they continued to perform, and had taken their lateral operation from it, ſubſtituting merely the ſtaff as a director for the ſtone, which alone directs

the ſurgeon in operating by the apparatus minor. They had transferred many of the rules of the apparatus minor to their new operation with the ſtaff, and eſpecially this, that Frere Jaques in feeling with the point of the knife for the ſtone groped at the ſame time above the pubis with the left hand, forcing the bladder to contract and preſs down the ſtone.—" Thus," ſays Dionis, " did he often preſs the fundus of the bladder againſt the point of the knife."—" He ſucceedeth better," ſays Buſſiere, * " when the ſtone is big and large, than when it is ſmall, by reaſon that a big ſtone not only extendeth the bladder, but ſtoppeth the point of the knife." No one will be ſurpriſed, as Morand was, that ecchymoſis was found behind the pubis, or extravaſations of blood within the pelvis, or abdomen; or that the veſſels at the root of the penis were divided; ſlighter deviations than thoſe deſcribed in the operation of Frere Jaques might turn the point of his knife to any of theſe parts. Neither will the modern lithotomiſt forget the contracted ſtate of the bladder, when the gorget is driven home into its cavity, for at that moment the urine is expelled, the bladder corrugated, the bowels depreſſed by the ſtraining of the abdomen, and the fundus of the bladder is in continual contact with the ſharp edge of the gorget.

Fourthly,—It is particularly worthy of notice; it is a point already touched upon in deſcribing the anatomy of the pelvis, and deſerving to be, on a future occaſion, more particularly explained; that by cutting thus from the hip towards the body of the bladder, in the deepeſt part of the pelvis, by wounding more of the body of the bladder than of its neck, there enſue fiſtulas of the cellular ſubſtance, and fœtid ſores, which, as much as the more deadly accidents, contributed to bring the operation of Frere Jaques into diſgrace.

Of this firſt operation then what can we ſay but that it partook of the genius of its inventor, a rude bold man; that it contained the elements of a good operation, but that the operator was expoſed to numberleſs errors, which, for want of education, he could not eſcape. Frere Jaques, whoſe operation was ſucceſsful only in the expeditious extraction of the ſtone, was, after a momentary enthuſiaſm in his favour, utterly forſaken even by his friends, and driven out of the city to go his old courſe round the provinces.

* Vid. this letter in the Philoſoph. Tranſact. anno 1699.

EXCELLENCY OF HIS SECOND OR CORRECTED OPERATION.

But his ſecond operation was the reſult of aſſiduous diſſections of theſe parts. In his new or reformed operation he uſed his dagger knife no longer, but diſſected with an ordinary ſcalpell upon a grooved ſtaff. The diſſection was as ſimple as that of the apparatus minor, with this difference only, that the projecting of the ſtaff directed the inciſion inſtead of the protruſion of the ſtone. Though by the ſlow and complete diſſection of the parts, the perinæum was completely relaxed, and the tranſverſalis and levator muſcles divided; though the external inciſion correſponded preciſely with that of his original operation, yet the inward inciſion was eſſentially different: in place of going ſo deep, or ſtriking the knife through the cellular ſubſtance that ſurrounds the rectum, or ſeeking the body of the bladder, the neck only of the bladder and the ſurrounding proſtate were cut; and they were divided by a fair, regular, and limited inciſion, the knife being run through the body of the gland along the groove of the ſtaff. The rectum and the pudic artery were equally out of danger, for the knife did not go ſo deep, and was not plunged blindly among the parts. The extraction of the ſtone was eaſy and expeditious. The external and internal wounds correſponded, and were oppoſed to each other ſo that there was no cavity formed among the cellular ſubſtance, nor fiſtulas, nor tedious cures.

His operation was from this time perfect, and for this invention Frere Jaques ranks in that ſtation, univerſally aſſigned him by a profeſſion now impartial and grateful, and the operation thus improved by the heads of Fagon and Du Verney, and the bold hand of this operator, was ſuch as left for Rau, and the furious rivals of Frere Jaques, nothing to improve in reſpect of the deſign, and, in reſpect of the manner in which it was performed, every thing to envy. Rau did not improve this operation! it was delivered perfect into his hands! he had indeed the advantage of performing it with the ſkill of an anatomiſt, and the courage of an experienced ſurgeon; but he had the meanneſs, never to be forgotten, of concealing from the world the preciſe manner in which he practiſed an operation which he was taught freely, by one whom he affected to deſpiſe, and contrived to ruin.

Thus do we owe to this illiterate man, whoſe modeſty, humility, and courage, whoſe charity, ſimplicity, and goodneſs, we muſt hold in reſpect, an operation which

has been approved of and performed by all the good lithotomiſts of Europe; and from his life and fortunes, one important leſſon may be deduced; we may learn how ſlightly we ſhould rely on our natural talents, how little faith we ſhould have in mere courage!—this intrepid fearleſs man committed nothing but butcheries, while he remained what has been termed a natural operator; but after having undergone the diſcipline of ſcience, and learnt the anatomy of the parts, he became truly valuable.

RAW'S METHOD OF PERFORMING LITHOTOMY.

Joannes Jacobus Raw, the moſt famous lithotomiſt of modern times, was born in the village of Baden in Swabia, in the year 1668, of parents far from wealthy; his father a wine-merchant, unable to give his ſon an education ſuitable to his genius, bound him apprentice, at fourteen years of age, to a ſurgeon in Straſburg, where he lived three years. At the end of that period, neglected by his parents, and unable to ſubſiſt at home, he began to wander far and wide through the world, ſcantily ſupplied with the means of travelling, or even with the neceſſaries of life. After paſſing through a great part of Germany, he arrived at Hamburgh, and having taken his paſſage for Bergen in Norway, he then entered into the ſervice of one Frawen, a ſurgeon; but could not long remain, being unable to endure the extreme cold of that country. It was eaſy to procure a paſſage to Amſterdam, for the intercourſe was then, as it always has been, very great, betwixt the countries. He accordingly embarked for Holland, and upon his arrival was received as ſurgeon in the ſhip of Count Benthem, with whom he viſited Spain and various parts. He had the good fortune to arrive again in Amſterdam, at the critical moment when King William was about to ſail for England with a gallant fleet, and was appointed ſurgeon to the vice-admiral Skey's ſhip.

Thus did Raw ſpend his firſt years in an unſettled and miſerable way of life, in the ſociety of men rude and brutal! the wages earned thus amidſt hardſhips and perils, he did not ſquander, but hoarded with particular care, whether animated by that ſordid paſſion for gain which ſtrongly marked every future action of his life, or from a more generous deſire of renewing his ſtudies and improving his mind, we dare not ſay. This only is certain, that on his return to Holland he betook himſelf to Leyden,

and there ſtudied all parts of learning with great ardour; and, having made himſelf acquainted with the doctrines of medicine in that ſchool, he travelled into France, and ſtudied anatomy and ſurgery in Paris under the beſt maſters: he diſſected much with his own hand; Du Verney was his chief preceptor, and Mery taught him the diſtribution of the nerves: under Myſhevius he learned to reduce luxations; and he followed Petit, then an old man of eighty years of age, Marechal Rowmart, and the great maſters of Paris, obſerving their practice in all the varieties of ſurgical diſeaſe.

Wearied at length of this wandering life, he returned into Holland and eſtabliſhed himſelf in Amſterdam, where he taught anatomy and practiſed ſurgery. While Raw, ſupported by the magiſtrates, and ſupplied with dead bodies, was lecturing in Amſterdam and performing the operations of the hoſpitals, Frere Jaques by chance arrived in that city, and performed his new operation, which Raw was always preſent at, and always loudly and violently condemned. Theſe invectives of Raw gave offence at firſt, and he was obliged to be ſilent for a time, but the event ſoon juſtified his predictions and induced the magiſtrates of the city to withdraw their confidence from Frere Jaques, and commit the poor, afflicted with the ſtone, into the particular care of Raw: he was elected lithotomiſt of the city of Leyden; his fame and reputation increaſed daily; pupils came to attend him from all the diſtant countries, and throughout all Holland he alone was called to perform the great operations, eſpecially that of cutting for the ſtone. He was ſoon invited, from a ſenſe of his uncommon talents, to teach anatomy in the public theatre at Leyden; and upon the death of the celebrated Bidloo, he received the crown and laſt reward of all his labours, being called to that chair which the counſellors and governors of the univerſity and the magiſtrates of the city pronounced him alone worthy to fill. Raw now forſook, with great reluctance, the ſociety he enjoyed in Amſterdam, where he had lived happily with his friends; the little pleaſures and indulgencies he enjoyed had become with him a ſecond nature; he could not but foreſee many unhappineſſes ariſing from this ſudden change in all the habits of his life, and the loſs of thoſe friendſhips which had been the chief pleaſure of his leiſure hours.

Yet he accepted the place; he was, in the year 1713, inſtalled in his office, and pronounced his celebrated oration on the teaching and improvement of anatomy; and ſoon after he attained the higheſt rank in the univerſity, being elected Regent.

The labours of this ſtation he undertook while in perfect health and vigour, nor

did he ever relax in the arduous duties of his office while health and ſtrength remained. But it unfortunately happened about four years before his death, that by a fall he ſprained his foot. At ſuch a period of life, after many years ſpent in ſtudy and labour, the ſpirits and health and whole frame of mind are apt to be affected by the moſt trivial cauſe. The pain occaſioned by this accident confined him for ſeveral months to bed, and when the pain ceaſed, an odema remained. The long ſilence and ſolitude of confinement ſucceeding to the buſtle of an active life, brought on melancholy and hypochondriaſis; the paroxiſms of this moſt afflicting diſeaſe were for two years frequent and diſmal; and the year before his death he ſuſtained a ſtroke of apoplexy. From this period, his health and bodily frame was entirely ruined; he was afflicted with ringing in the ears, an evening fever and night ſweats, by which his ſtrength was exhauſted. His melancholy increaſed to the moſt afflicting degree; the ſlighteſt noiſe alarmed him; the ringing of bells, the crowing of cocks, the voices in the ſtreets, brought on intolerable anxieties, till at laſt this melancholic delirium ended in madneſs: he, after four years of ſuffering, expired loaded with fame, riches, and honours, beyond his moſt ſanguine hopes: he died on the 18th of September 1719, and was buried in the great church of Leyden.

"Raw was of a robuſt and manly form, his countenance ſomewhat ſevere and ſtern: he was of a generous, active, and fiery ſpirit; ingenious, laborious, covetous of honour, ſeeking it, not by art but by his own honeſt deſerts: he lived an unmarried life, ſober and frugal, yet he was generous and cheerful with his friends: he was incapable of flattery, diſſimulation, or cunning, unſparing in his cenſures, diligent in correcting thoſe errors which affected his profeſſion, ſevere in his invectives, eſpecially againſt thoſe who erred in matters of ſcience; but this ſpirit we aſcribe not to a love of ſatire, but to a certain enthuſiaſm and love of truth, and to a proud confidence in his own natural powers. To remember his boiſterous manners or rude ſpeech as a ſubject of reproach, were moſt ungenerous, for he lived a miſerable and wandering life during thoſe early years in which the mind, ſoft and pliant as wax, receives too eaſily the impreſſions of ſurrounding objects, and is formed by chance and by the ſociety in which we live! no, it is rather a matter of wonder that he became ſo great a man *."

* "Fuit autem corpore magno et robuſto, egregiaque et virili plane forma, vultu ſevero, et torva nonnihil tuente. Fuit animo generoſo, promto, et alacri; totus tamen paulo fervidior atque commotior. Cæterum ingenioſus, laborioſus, et attentus; atque gloriæ ſemper cupidiſſimus, quam non arte ſed aperte palamque meritis ſuis acquirere ſtudebat. Vixit in cœlibatu, parce et ſobrie; libere tamen, et cum amicis hilarus. Adulari admodum

Theſe are the ſlight memorials left us by Albinus of the celebrated Raw: his ſpirit of enterpriſe and love of ſcience; his diligence in ſtudy, and his frugal and ſimple way of life; the fortitude with which he reſiſted the corruption of bad example, and the ſteadineſs with which he reſerved the earnings of a ſevere and laborious profeſſion, to enable him to renew his ſtudies at an advanced period of life, are moſt commendable. The perſeverance with which he ſtruggled, during the early part of life, againſt penury and want the res anguſta domi, gave proof at once of his excellent genius and conſummate prudence. "The nobleſt blood in all the land's abaſhed, having no lackey but pale poverty*." He ſtudied anatomy, not by reading nor by diſſecting animals, but by diſſecting the human body; this he regarded as the firſt and moſt eſſential point of his education, and ſpared no expence, no travail, no ſolitary labour, to attain to a perfect knowledge of the ſtructure of the human body: he was ſoon diſtinguiſhed as the firſt ſurgeon of his age, and certainly was the moſt celebrated lithotomiſt that ever lived. Before publiſhing his oration, he had cut one thouſand five hundred and forty patients for the ſtone †. His operations were attended by ſtudents from all parts of the world, and after his death his method of operating was imitated by all the ſurgeons in Europe. One thing is ever to be lamented, that this great man had contracted, in his years of penury, not merely habits of laudable œconomy, and a decent reſpect to the neceſſary affairs of the world; he was viſited early in life with that mean vice which eats up every virtue, grows continually as we advance in years, and in our liberal profeſſion deſtroys the ſeeds of charity and every generous ſentiment. This ſin of uncharitableneſs, Albinus his friend and favourite would fain conceal; but whatever might be due to Raw from his fellow citizens, from thoſe who felt the immediate benefit of his ſkill, on poſterity he has no claim! his ſordid temper made him commit an unpardonable crime againſt his profeſſion, and the intereſts of humanity: he concealed his operation to the very moment of his death!

non poterat, neque ſuſtinere diu ſimulationem. Itaque minime facile et diu parcere ſolebat, ſed alios reprehendebat. Errores evellere conabatur; in multos vehementius quoque invectus, præſertim ſi quos in ſua arte à vero abeſſe exiſtimaret. Quod eum non tam carpendi aut lædendi libidine feciſſe credimus; quàm veritatis aſſerendæ et defendendæ ſtudio atque impetu quodam, et quòd non prorſus abjecte de ſe ſentiret."

* "Haud facile emergent, quorum virtutibus obſtat
Res anguſta domi."

† To cut one patient daily it would take him three years to accompliſh this number; but even this ſurpriſing number he had cut at an early period of his career. It is probable that as he cut almoſt every day, he had cut to the number of three thouſand and more during his life.

When firſt Raw cut for the ſtone, he performed the Marian operation with all the apparatus, opening the urethra by cutting, as he had been taught in Paris, upon the perinæum, not upon the hip. When Frere Jaques firſt appeared in Holland, Raw was by virtue of his office and by authority of the magiſtrates preſent at his operations, and had the privilege of opening the bodies of thoſe who died; from him he avowedly learnt the operation which he afterwards performed, and it will be recollected that Frere Jaques, at this time rude and ignorant of anatomy and all the ſcientific rules of operating, ſtruck his dagger-like knife into the body of the bladder, cutting from the point of the hip. Raw had no higher ambition at this time than to correct the irregularities of this mode of inciſion; and he profeſſedly divided, in his new operation, the ſame parts which were divided by Frere Jaques. "His deſign was not to divide the neck of the bladder as in the earlier operations, nor the urethra as in the uſual operation of the apparatus major, *but the body of the bladder near its neck, towards the ſide and lower part*, an inciſion (ſays Albinus) which could not well be attended with any greater danger than thoſe in which the urethra or cervix are cut; and ſince in this inciſion the cervix veſicæ is left entire, neither wounded with the knife nor dilated with inſtruments, nor cruelly lacerated in extracting (as often happens) a large and rugged ſtone, the operation could not fail to be infinitely ſafer than that in common uſe."

"Propoſitum in hac operatione erat, non cervicem veſicæ incidere, ut primo fecerant, nec urethram, ut eo tempore plerique ſolebant, *ſed veſicam ipſam, proxime cervicem ejus*, à latere, nonnihil inferiora et poſteriora verſus. Quæ quidem veſicæ ſectio periculoſior per ſe multum eſſe non poterat, quàm vel cervicis, vel urethræ. *Et cum ſic urethra et cervix integra manerent*, et neque inſtrumenta introducendo et vi magnâ diducendo, neque etiam calculum, magnum ſæpe et ſcabrum aſperumque, violenter et crudeliter plane extrahendo, via hac neceſſario anguſtæ parteſque tenerrimæ læderentur; et multa quæ hæc conſequi fere ſolent maximaque mala præcaverentur, longe vulgaribus antecellere videbatur."

This his new operation, Raw performed with all the advantages of anatomical knowledge and ſurgical ſkill; but he could not be long inſenſible to the dangers of an inciſion which paſſes not through the proſtate gland and that part of the bladder which is the moſt directly oppoſed to the external wound, but into the body of the bladder behind the gland, at the part where the bladder lies deep within the pelvis, and is almoſt inacceſſible to the moſt dextrous ſurgeon. While Raw was meditating on theſe dangers, and conſcious of the ill conſequences inevitably

resulting from this deep incision, Frere Jaques appeared again, and it will be recollected that he now performed a new operation corrected by Fagon and Du Verney. "He had," as he whispered to Salzmannus, "left off his former rash way of operating and cut now upon a grooved catheter." He cut not into the body of the bladder, but into the neck of the bladder, through the substance of the prostate gland. This was the operation which Raw learnt and adopted; the use of a grooved catheter was the sole invention boasted of by Raw or claimed in his favour by his pupil Albinus.

"Itaque negari quidem non potest præivisse Rauio Fratrem Jacobum: hoc tamen ei hodieque et semper esse debet laudi maximæque gloriæ, quòd peritia, ingenio, et industria sua, id addiderit, quo solo curatio, cæteroquin incerta, periculosa, et plerumque perniciosa, reddita est certa, tutior, et cæteris forte melior et præstabilior. *Addidit autem catheterem, ut vocant, qui gibba sui parte sulcum profunde infissum haberet;* quem per urinæ iter in vesicam demitteret, et ad vesicæ locum, qui incidendus erat, gibbo suo apprimeret, ut eum cultrum porro dirigere, supra eum vesicam certo incidere, instrumentaque pro forcipe tutò rectàque dirigenda immittere posset, plane ut apparatu magno fieri solet."

By the valuable lessons which Du Verney, Fagon, and Felix, gave to Frere Jaques, and by his confession to Salzmannus, of an entire change in his operation, Raw was excluded from every claim as an original inventor; yet, as by his talents for operating he had become famous when Frere Jaques was dead, and he alone left to perform the operation, it became to him a sort of property; he was supposed to have a peculiar method of his own; it was believed that he alone, of all the surgeons in Europe, knew the true method of Frere Jaques, the art of cutting with safety into the body of the bladder, behind the gland. He had indeed done so in his first operations; and now his reputation being involved, it became his interest to deceive the profession into a belief that he continued to perform this juggling trick of cutting entirely behind the prostate gland.

We are now arrived at that part of our narrative which we enter upon with reluctance. Raw had learnt his operation from this open and ingenious man, "whom he affected to despise and conspired to ruin;" the sin of his ingratitude stands indeed the most prominent point in his character: but there is another accusation of a blacker die; his sordid temper induced him to do a deep and irremediable injury to that profession of which he was a sworn supporter. Raw, a man of science, a professed teacher of youth, whose appointed office it was to instruct them the manner of

performing ſurgical operations, refuſed to explain this operation in which he particularly excelled. Heiſter, who was among the pupils of Raw, ſeems to have felt an honeſt indignation at his conduct, and has commemorated the ſordid temper of his unworthy maſter. "Raw," ſays he, "alive only to motives of gain, concealed his operation from all his pupils, and from myſelf; he would not teach us how to perform it, leſt his own profits ſhould be leſſened; a meanneſs which every man of dignified ſentiment muſt hold in contempt, preferring ſincerely the public welfare to his private gain *." All the profeſſion was diſguſted with his ſentiments and conduct: his expreſſions were equally mean, rude, and unmannerly: he told his pupils, "that as for this operation, he was to gain his bread by it, and never would ſay one word about it as long as he lived; and that if they did prevail with him to ſpeak on this ſubject, they would do wiſely not to believe what he ſaid." Theſe were the familiar and blunt expreſſions of this rude man, who often however condeſcended to uſe more polite and ſcholar-like expreſſions, ſaying to thoſe who aſked him to diſcloſe his ſecret, "Legite Celſum." His ſecret! he had no title to reſerve from the world one point of knowledge even the moſt trifling: he was equally bound by humanity and duty to diſcloſe his operation: the patrons of the univerſity, and the magiſtrates of the city, in appointing him to ſo high a charge, bought his time, his talents, and all his petty ſecrets, with honours, of which he ſhowed himſelf but little deſerving.

The anxiety of the profeſſion to diſcover the operation of Raw never ceaſed, and thoſe were held in ſome eſtimation who were ſuppoſed to know and practiſe it. Dennis, a ſurgeon in Holland, took advantage of this temper, and made one experiment more upon the credulity of the public; he gave the public to underſtand that Raw whiſpered to him, with his dying breath, the full and true account of his operation, and that he, Maſter Dennis, continued the depoſitory of this *important and beneficial ſecret:* the ſordid motives of Raw appear infinitely more offenſive in the perſon of this his wretched follower: his book, intitled Obſervationes Chirurgiæ

* Hoc olim celavit *valde ad rem attentus* Ravius, ſuis diſcipulis, et inter hos etiam Dom. Præſide (viz. Heiſter), dicendo ſe eos ſuam methodum non docere, ne ſcil. eam damnum poſtea inferrent: à qua vero turpi invidia vel avaritia, vir bonus, honeſtus, et cordatus ex Dom. Præſidis ſententia debet ipſe quam alieniſſimus et potius pro utilitate publica, quam pro propria ſollicitus eſſe."

"Enchyreſes ſuas celabat Raavius quærentibus, dicens aperte victum inde ſibi petendum eſſe, adeoque dum viveret, nihil de hoc ſe patefacturum eſſe, et ſi quid etiam dicere cogeretur, verum non dicturum eſſe." Breyer, page 495.

de Calculo, is apparently an earneſt expoſition of the dangers of the operation by the apparatus major, and a fair parallel of it with the lateral inciſions of Raw; while it is in truth but an advertiſement unworthy of a mountebank. This boaſted operation Dennis never has the honeſty to deſcribe, from the beginning to the concluſion of his treatiſe; the only paſſage in which he mentions the operation, is this: "Concludo itaque methodum Rawianam, *qua jam duodecim annis utor*, *optimam eſſe omnium* huc uſque inventarum." Whoever reads attentively this book of Dennis, will not wonder at this ſentence, nor expect a work like his to come to any more worthy concluſion. He deſigned merely to perſuade the world that the operation of Raw was the beſt poſſible, and that he, Mr. Dennis, knew how to perform, and had actually performed it for twelve years *.

While Dennis was thus repeating the offence and making a ſecret, in his turn, of the ſecret operation of Raw, the intereſts of humanity were ſuffering! all the ſurgeons of Europe employed themſelves in learning, by diſſection, this mode of inciſion, with no other guide than a confuſed tradition that Raw had opened only the body of the bladder behind the proſtate gland! while many were making experiments in

* Dennis publiſhed this inſignificant book in the year 1732; the ſentence quoted above is, to the beſt of my recollection, the only one in which he mentions the operation of Raw; he never deſcribes it, I am perſuaded he could not perform it; even this piece of cunning and his twelve years experience in operating, never brought him into repute. The tale he tells is, I believe, a falſhood; for however much he might be the favourite of Raw, his ſecretary, his confident, his aſſiſtant in operations, he knew nothing of what Raw did; he had but the diſguſting duty of aſſiſting an operator whoſe confidence he did not enjoy. If Raw was jealous of his pupils, would he not be jealous of ſo *excellent an operator* as Dennis? His aſſiſtants were thoſe againſt whom he had chiefly to be upon his guard, and I am perſuaded that he kept his ſecret from none ſo carefully as from Dennis, who ſometimes, and from Albinus, who often aſſiſted him. That Dennis received the account of this operation from Raw upon his death-bed, is inconſiſtent with every authentic hiſtory of the laſt hours, or even of the laſt years of this celebrated man, who lingered in a ſtate of melancholy, and died in paroxiſms of delirium and inſanity. A death-bed is indeed a time for telling ſecrets, but not of this nature, if the old gentleman had had a thouſand pounds hid under a tile, as might very naturally be, he might have told ſuch a ſecret to Dennis, who would have been fully as glad of this kind of ſecret as any other man; but that Raw ſhould ſit up in his bed in articulo mortis, take off his night-cap, and, holding maſter Dennis by the two hands, explain to him how to cut for the ſtone, is very unlikely.

Amſterdam has been, for time immemorial, the emporium of ſurgical ſecrets; the lever of Ruinhuiſen, the fillets and parturient pills of various diſcoverers among the Dutch, the undivulged arts of the celebrated Ruiſh, the mummy-making ſecrets of Bills, who boaſted that he could preſerve bodies either ſoft or hard as he pleaſed, and as freſh as if alive, are a ſort of vindication of Raw and Dennis. It was the faſhion of the times, and this was a country where they held a great trade in ſecrets, and were aſhamed of nothing that was any way profitable.

hoſpitals by which innumerable lives were loſt. Thoſe made in England were attended with the moſt diſmal conſequences, and the celebrated Cheſſelden was the man who had to lament and to confeſs the errors he had committed in attempting to imitate Raw.—"Raw," ſays Cheſſelden, "ſucceeded wonderfully, and if he, who was an excellent anatomiſt, may be allowed to have underſtood his own operation, it was directly into the bladder without wounding either the urethra or the proſtates. Beſides this, other competent judges who were the witneſſes of his operations have borne the ſame teſtimony."—* "Hearing then of the great ſucceſs of Mr. Raw, profeſſor of anatomy at Leyden, I determined to try, though not in the ſame manner, to cut directly into the bladder; and, as his operation was an improvement of Frere Jaques, I endeavoured to improve upon him by filling the bladder as Douglaſs did, in the high way with water, leaving the catheter in, and then cutting on the outſide of the catheter into the bladder, into the ſame place as upon the gripe, viz. in *the body of the bladder*, which I could do very readily and take out a ſtone of any ſize with more eaſe than the other way †." Thus was our great ſurgeon (not yet truſting to his anatomical knowledge, nor inventing an operation for himſelf,) ſeduced by this rumour of the ſucceſs of Raw, and of the depth of his inciſion; and by cutting thus deep behind the gland, Cheſſelden had the unhappineſs to ſee many of his patients die, ſprawling upon their belly with pain and agony. "My patients ſeemed," ſays Cheſſelden, "for ſome days out of danger, but the urine which came out of the bladder continued lodging upon the cellular membrane on the outſide of the rectum, attended with a vaſt diſcharge of ſtinking matter, and from this cauſe I loſt four patients out of ten." Cheſſelden, while attempting this innovation, ſaw, with vexation, ſcenes of terrible ſuffering: we find, by his own report, that after this operation, gangrenous abſceſſes and tedious ſores enſued; that his patients ſometimes ſprawled upon their bellies for a fortnight, writhing with agony, and ſuffering ſomething like a paralyſis of the lower extremities; from the extremity of pain ‡ after ſuch misfortunes, ariſing from the mean and covetous temper of Raw, it is impoſſible to think of him with reſpect.

We cannot read what Sandifort has delivered to us of the hiſtory of Albinus, without lamenting that he ſhould have been long the aſſiſtant without ever becoming the confident of Raw. The aſſiſtant is to the ſurgeon as a friend, adviſer, and

* Anatomy, page 326. † Ibid. page 328.

‡ Vide Appendix to the Anatomy, page 330.

counſellor, in all the difficulties of his operations, to whom he muſt entruſt, in ſome degree, his own reputation and his patient's ſafety, and to whom he owes in return every ſentiment of confidence and friendſhip. What ſhall we think of Raw, who kept even the celebrated Albinus an alien from his thoughts, and uſed him as a common aſſiſtant, as an unintelligent inſtrument in his hands?

"While Raw was a lecturer in Leyden, Albinus attended his leſſons with ſo much aſſiduity, that Raw, captivated with his perſonal attachment and enthuſiaſm in ſcience, willingly communicated to him every thing that was new or intereſting. He was ſo pleaſed with Albinus that, in difficult caſes and in all ſurgical operations, he choſe him for his aſſiſtant, eſpecially in operating for the ſtone. This operation, although improved by Raw, and performed by him more than a thouſand times ſucceſsfully, he never yet revealed. But ſuch opportunities had Albinus of remarking every ſtep of the proceſs, that no one ever did nor ever could deſcribe his operation ſo correctly *." Theſe are the words in which Sandifort deſcribes the affection of Raw for his celebrated pupil Albinus. Yet theſe are but ſlender grounds for the confidence with which Albinus has written the hiſtory of Raw's lithotomy. He could not be otherwiſe than extremely deſirous to learn the eſſentials of that operation, in the performing of which he was ſo often a party; he believed he underſtood it; he wrote freely what he knew; but we ſhall find in the ſequel that he was deceived; and it marks only more diſguſtingly the cunning of this Raw, and the pains he took to deceive, that he was able thus to impoſe upon the greateſt anatomiſt of the age.

Theſe traits of character are not without their uſe. I am conſcious that till I had inveſtigated the hiſtory and obtained as it were a perſonal knowledge of theſe great men; till I had reflected on their motives and weighed their talents and diſpoſition; I never could form a deciſive choice among the operations they

* "Vivebat tunc Leidæ, ex hâc noſtrâ introductione, jam notiſſimus Rauïus, artis anatomicæ atque chirurgicæ docendæ ac faciendæ dexteritate inclytus. Ad hunc itaque ſeſe applicuit; hujus prælectionibus ac demonſtrationibus tali aſſiduitate interfuit, ut is, captus tanti ingenii ſolertiâ et ardenti ſtudio, quicquid in arte eximii haberet liberaliter cum illo communicaret. Rauïus Albinum tantâ complectebatur benevolentiâ, ut in rebus difficillimis, et quando operationes chirurgicæ ipſæ eſſent inſtituendæ, Albinum comitem eligeret; præſertim cùm ageretur de calculo veſicâ exſcindendo: quam operationem, ab ipſo emendatam, millies et amplius cum ſucceſſu adminiſtratam, nulli revelavit; ſed toties, præſente Albino, inſtituit, ut egregiam omnes encheireſes ritè obſervandi occaſionem ipſi dederit non tantum, ſed etiam præ cæteris dignum habuerit, cui in poſterum, cùm ab itineribus rediiſſet, calculo veſicæ laborantes ſecandos commendaret: adeo ut nemo poſtea aut meliùs aut exactiùs ipſius methodum deſcripſerit vel deſcribere potuerit."

performed. I am ſincerely deſirous that my reader ſhould be acquainted with the opinions of the profeſſion; with the men who ſupported the reputation of ſurgery in its moſt flouriſhing æra! when anatomy was cultivated, and operations originally projected and executed by thoſe who were thoroughly acquainted with the anatomy of the parts! when Albinus, Raw, and Cheſſelden, were the firſt ſurgeons in their reſpective countries! when lithotomy was thoroughly ſtudied, and the peculiar advantages and faults of each method diſcovered both by experience and by diſſection.

The authorities I now proceed to quote ſhall be plain and direct, and ſhall relate to that point ſolely which is the moſt important of all, viz. WHETHER THE LITHOTOMIST SHOULD CUT INTO THE BODY OR INTO THE NECK OF THE BLADDER, AND IN WHAT FORM THE INCISION SHOULD BE PERFORMED.

When the memoir of Albinus was firſt given to the world, thus ſtood the doctrine: that, in cutting for the ſtone, it was eſpecially deſirable to ſpare the neck of the bladder and the ſurrounding proſtate: that, theſe parts being left entire, fiſtula and incontinence of urine would be as impoſſible in cutting from the perinæum as in cutting by the high operation above the pubis. This was a ſhort-ſighted precaution; for this very form of inciſion, which it was imagined muſt prevent fiſtulas, was the certain cauſe both of fiſtula and of every other danger.

The hiſtory of Raw's lithotomy, as delivered by Albinus, ſerved to impreſs this prejudice more ſtrongly upon the public mind. His narrative ſeemed to prove that Raw had operated according to theſe principles, and in imitation of the deep inciſion of Frere Jaques. Albinus, adding his own authority, argued that "the wound of *the body of the bladder could not be more dangerous than that of the urethra or cervix*, and that good anatomiſts could find no difficulty, at leaſt no inſurmountable difficulty, in cutting thus deep into the pelvis."

"It was the deſign of Raw," ſays Albinus, "to divide not the neck of the bladder, as in the earlier operations, nor the urethra, as in the uſual operation, by the great apparatus, but the *body of the bladder itſelf near the neck*, a little to one ſide, and towards its lower and poſterior part; an inciſion which ſurely could not be more dangerous than that of the urethra or of the cervix: and ſince, in this way, the urethra and the cervix are left entire, neither wounded with the knife nor dilated with inſtruments, nor cruelly lacerated by the extraction (as often happens) of a large and rugged ſtone, this inciſion could not but be infinitely preferable to that in common uſe. Yet this inciſion, though in itſelf ſafe, is difficult to perform,

ſince this part of the bladder lies very deep, only to be reached when the patient is laid ſupine, his knees raiſed, his thighs moderately bent, and held aſunder. Then, by cutting firſt the ſkin by the ſide of the anus, next proſecuting that inciſion obliquely inwards and upwards, the knife, thus directed, reaches the deſtined part of the bladder; and if theſe various inciſions be correctly made, there is no part in the way of the knife to create any real or inſuperable difficulty, though, no queſtion, both the thickneſs of the ſkin and muſcles to be diſſected, and the proximity of important parts which we muſt not wound, make this a very critical inciſion. Should the ſurgeon cut too deep, or decline ever ſo little from the true courſe of the inciſion, he is in danger of transfixing the bladder, or of wounding the rectum, the veſiculæ, or the mouth of the ureter, the erector muſcle, or the cavernous body of the penis, where it ariſes from the pubis: the urethra too may be wounded or entirely divided from the bladder. Nor is all ſafe even after the inciſions are rightly performed; for, in ſo oblique a wound, the forceps are apt to glide to one ſide, and, in place of entering in the right direction into the bladder, ſeparate the adjacent parts, and then the ſurgeon, opening the forceps, and ſearching in vain for the ſtone, ſeizes whatever is interpoſed betwixt the forceps and the ſtone, and not only fails in his operation, but, by lacerating the parts, brings the patient into imminent danger. Such misfortunes are well known to have happened in the practice of Frere Jaques, who, being ignorant of the ſtructure of the parts, had no rule to guide his knife or forceps by. Far from approving of his operation, I ſcruple not to affirm that his invention was dangerous to humanity and often fatal to the individuals who fell into his hands; better had it been that his method had never been imagined, were it not that it ſuggeſted to the celebrated Raw a more perfect operation; for Raw, thoroughly ſkilled in the anatomy of the parts, knowing correctly what parts ſhould be wounded and what avoided, was ſenſible that nothing was wanting to render Frere Jaques's operation perfect, except regulating the plan of the inciſions ſo as to *carry the knife fairly and directly to this part of the bladder;* and ſuch a form of inciſion did he invent and perform moſt ſucceſsfully."

"It cannot indeed be denied that Frere Jaques was his maſter; yet to Raw alone is to be aſcribed the merit of having by his knowledge and genius made that mode of inciſions, hitherto the moſt fatal or dangerous, the moſt ſucceſsful and certain of any, giving it a ſuperiority over all others. Raw added to the apparatus of Frere Jaques, a grooved ſtaff: this ſtaff he paſſed down the urethra, preſſing its

convexity ſo firmly againſt the part of the bladder that was to be opened, as to be felt in the perinæum: upon this he cut his outward inciſion; to this point he directed his knife, and upon this projecting part of the ſtaff he opened the bladder with certainty, and along this grooved part of the catheter he paſſed his conductor, and along the conductor the forceps were introduced, as in the apparatus major. But ſeeing that the ſtaff uſed by thoſe who cut upon the perinæum was too ſlightly curved to be eaſily preſſed againſt the body of the bladder, he invented a ſtaff differing in theſe reſpects from that in common uſe; firſt, where the ſhaft of the ſtaff ends and the groove and the curvature of the ſtaff begin, the angle was very acute: ſecondly, the ſtaff from the angle forwards was elongated into a ſtraight beak, that the operator might cut boldly along this part of the ſtaff, and, by moving his knife backwards and forwards, open the bladder with an ample wound. Theſe were improvements naturally ſuggeſted to him by comparing the anatomy of theſe parts with the general ſcope and deſign of the operation."

So much for the deſign: as for the manner in which he performed his operation, it is explained to us by Albinus, his favourite aſſiſtant, in the following words: " * Having placed his patient in the uſual manner, and paſſed the ſtaff, he took the handle of it betwixt the finger and thumb of the left hand; he inclined the handle ſteadily and gently towards the right groin, and preſſed it down upon the belly, ſo as to preſs the curve of the ſtaff (which in that poſture lies in the neck of the bladder) cloſe againſt the part that is to be cut, which, as has been already explained, is near the neck, towards its lateral and poſterior part: preſſing then the ſtaff from above, againſt this point of the bladder, he felt for it from below with the point of the right thumb, (preſſing againſt the ſoft part of the buttock to the left of the anus, betwixt it and the tuber or bump of iſchium, on which we reſt in ſitting,) and by preſſing alternately the ſtaff downwards with the left hand, and the thumb of the right hand upwards, he felt the curve of the ſtaff diſtinctly, and marked the place of the firſt inciſion: his mark was an inch or two finger breadths

* " Hinc catheteris manubrium, ſiniſtræ digitis et pollice prehenſum, leniter et prudenter verſùs ægri ventrem dextrumque inguen inclinabat; ut catheteris curvatura ſulcata, in veſicâ prope cervicem ejus hærens, applicaretur ad veſicæ locum incidendum, ad latus ſiniſtrum, et, uti dictum eſt in principio, *proximè cervicem, nonnihil inferiora et poſteriora verſùs.* Quo facto, catheterem leniter ad eum locum apprimebat, eodemque tempore dextræ pollicem extrinſecus admovebat ad mollem natium regionem, quæ ad ſiniſtram ani eſt, inter eum et oſſis iſchii tuber magnum quod ſedentem ſuſtinet, è regione curvaturæ catheteris. Tumque catheterem pollicem dextrum verſùs leniter impellendo, et viciſſim eodem tempore pollicem dextrum catheterem verſùs à ſiniſtris et inferioribus dextrorſum ſurſumque premendo, extrinſecus inveniebat et notabat locum, qui cur-

to the left of the anus, not nearer, left he ſhould touch the rectum, nor farther off, left he ſhould be obliged to make his wound too oblique. Yet, according to the age of the patient or the feelings of the parts, his inciſion varied: he cut his external inciſion ſometimes high, ſometimes low, ſometimes nearer, ſometimes farther from the anus; the curve of the catheter always ſufficiently denoting the elected point of the bladder. His external wound of the ſkin and fat he made from above obliquely downwards, inclining ſomewhat towards the tuber iſchii to avoid the rectum; but about this external inciſion he was by no means ſolicitous. As ſoon as the inciſion was made, he introduced into it the thumb of his right hand or the fore-finger, feeling carefully for the catheter, turning the catheter at the ſame moment with the left hand, ſo as to place the curve correctly againſt the part of the bladder that was to be opened. Having marked the place of the catheter, he withdrew his thumb, and introduced the point of his knife, but not deep, carried it cautiouſly towards the curve of the catheter which he had juſt before diſtinguiſhed with the point of the finger, and made his way towards it by diſſecting carefully all the intervening fibres; and left, in the courſe of this little diſſection, he ſhould wound the rectum, he uſually introduced his fore-finger into the anus. When by diſſecting thus he had nearly reached the bladder, he introduced the finger or thumb once more into the wound, feeling for the ſtaff and adjuſting its poſture, if it had been diſplaced by any motion of the patient; and, once more marking the preciſe poſition of the curve of the ſtaff upon which the bladder

vaturæ catheteris oppoſitus eſſet, cui nempe plaga primo erat infligenda. Is igitur erat ad latus ani ſiniſtrum, pollicem vel digitos tranſverſos duos circiter ab eo verſùs tuber oſſis iſchii remotus. Non propior ano, ne rectum inteſtinum facile læderetur; nec ab eo remotior, ne cultrum nimis oblique catheterem verſùs adigere neceſſum foret. Tamen pro ætate, proceritate, et variâ harum partium in multis conſtructione et amplitudine, modò prepius anum, modò remotius ab eo, modò altius, modò demiſſius paullo, cutim incidebat; ſemperque locum intus veſicæ appreſſa catheteris curvatura ſatis indicabat. Invento loco, ibi primo cutem fere ſolam et pinguedinis pauxillum incidebat, plaga recta, longa ſatis, à ſuperioribus ad inferiora et exteriora, id eſt, verſùs oſſis iſchii tuber, nonnihil ducta; ut nempe à recto inteſtino recederet. Hanc autem primam plagam faciebat animo non valde ſollicito. Mox in eam plagam adigere dextræ pollicem, vel et indicem, eâ parte, quæ ungui opponitur, catheterem verſùs, quem ad locum veſicæ incidendum ſiniſtra, quantum poterat, applicatum tenebat; quærens iterum catheterem. Quo reperto, retrahebat pollicem, ſtatim cultri ſui apicem in plagam prudenter, nec alte admodum, immittebat, et verſùs catheterem, quem pollice paullo ante exploraverat, caute dirigebat, leviter diſcindens quibus occurrebat. Et ne ſic rectum inteſtinum facile vulneraret, plerumque digitum in anum ægri leniter prius dimittebat, ut recti inteſtini poſituram penitus cognoſcere, idque tanto certius vitaret. Cum ſic leviter ſcindendo fere ad veſicam perventum eſſet, iterum in vulnus introtrudebat pollicem indicemve, catheterem ut ante quærens, eumque, ſi ægri jactatione remotus forte eſſet, reſtituens, ſimulque accurate obſervans et memoriâ retinens locum poſitionemque curvaturæ cathe-

was next to be wounded! he moved with the greateſt precaution, intreated the aſſiſtants and the patient to be ſteady! The ſtaff he held ſteady with the left hand, and with the right he introduced the knife, and with the point of it he touched the ſtaff, but without cutting, only holding the point directly towards the ſtaff! Then he, with the utmoſt circumſpection and caution, ſtruck the point of the knife into the groove of the ſtaff, and was ſatisfied that he had accompliſhed his part of the operation when the knife and the ſtaff encountered each other, and when he could feel, by moving the knife from ſide to ſide, that it was fairly engaged in the groove. Then moving the point of the knife cautiouſly and ſteadily upwards and downwards in the groove, but more particularly downwards, and turning the ſtaff ſkilfully ſo as to favour the knife, *he opened the bladder* with a wound not remarkably wide." "The poſition of the ſtaff regulated the courſe of the wound, and directed it ſomewhat downwards and outwards, a direction which was neceſſary to prevent wounding important parts. His next care was to prevent the ſtaff ſlipping out of the wound, and, by introducing his finger, to aſcertain its ſize and feel it naked."

Albinus, in this deſcription, firſt plainly delineates the plan and theory of this operation. "It was the deſign of Raw to cut, in imitation of Frere Jaques, *the body of the bladder near the neck.*" Non cervicem veſicæ ut primo fecerunt, nec urethram ut eo tempore plerique ſolebant,—*ſed veſicam ipſam proximè cervicem!* and this word *proximè* is ſo abſolutely excluſive of the neck, that a more decided or more irrevocable word could not have been uſed. He next explains the innovations propoſed by Raw, viz. the uſing a grooved ſtaff with an acute angle at the place of its bending, and a beak ſo long as to lie deeper within the body of the bladder, and which, being preſſed ſteadily downwards, ſhould project that part of the bladder which was to be opened and be eaſily felt in the hip, betwixt the tuber iſchii and the opening of the anus. And, thirdly, he explains how the operation

teris, ſupra quam veſica ipſa proxime erat incidenda. Quod facturus, circumſpectius agebat; hortabatur et obſecrabat adjutores, ne ægrum ſe cluneſque præſertim ſuas jactare ſinerent; ægrum, ut ſe contineret; ipſe, catheterem ſiniſtrâ ad locum incidendum applicatum retinens, dextrâ confeſtim cultrum per plagam ad catheterem caute admovebat, ita ut ille non ſcinderet, ſed ut mucro ejus ad catheterem rectà tenderet. Tunc attente et prudenter operam dabat, ut cultri mucronem in catheteris ſulcum punctim dimitteret. Id autem ex ſententia ſucceſſiſſe ſciebat, quamprimum cultri mucronem et catheteri inniti, et in latus utrumque leniter motum ſulci parietibus retineri deprehendebat. Tunc igitur, cultri mucronem in ſulco catheteris circumſpecte et firmiter ſurſum deorſumque ducens, magis tamen deorſum, catheterem etiam cultro perite accommodans veſicam incidebat, plagâ non admodum magnâ."

is to be executed by making a large and free incision, dissecting cautiously forwards towards the catheter, feeling it distinctly, placing it fairly, and opening the bladder by running the point of the knife backwards and forwards along the groove of the staff, but chiefly backwards. In the course of this long, interesting, and most circumstantial description, the body of the bladder is mentioned repeatedly; the prostate gland never; the cervix or urethra once only, and that in contradistinction to the parts that are to be cut. "This is a wound certainly not more dangerous than that of the urethra or cervix." Could it be believed that after declarations so express and decisive, Albinus should, in his latter days, in his days, I believe we may say, of imbecility and dotage, deny that he ever had represented the operation of Frere Jaques as performed by an incision through the body of the bladder?

No sooner was the operation of Raw announced to the world by so great a man as Albinus, a skilful anatomist, the pupil, friend, and assistant of Raw, than all the surgeons of Europe entered upon the enterprise with absolute confidence of success. The experiments of the best anatomists were attended with the worst consequences; not only did they rarely succeed in cutting into the body of the bladder, but there was an irregularity in the effects of their incisions very difficult to account for. "I performed," says Mr. Morand, "many experiments according to the very letter of the book (viz. the treatise of Albinus); the experiments were made in presence of Messrs. Molinelli, Condoidi, and Pringle; one read the words of Albinus, another held the subject, while I performed the incisions; and, though I operated with the same instruments, the same assistants, the subject carefully held in the same posture, my incisions took place in very different parts. 1st, In one body we found the great prostate divided two thirds of its length. 2dly, In another body was divided part of the prostate, and what is usually called the neck of the bladder. 3dly, In a third subject we found that the knife had entered the body of the bladder in the middle betwixt the ureters. "Whence," says Morand, "we may infer that, since Raw did not choose to explain his method, no one could know how he conducted his knife, when within the wound, nor through what parts." * Morand was persuaded that Raw had never cut thus behind the prostate gland, but had performed in effect the operation of Celsus, cutting the neck of the bladder only, and not the body. He remonstrated with Albinus on the imprudence of his report; and this was the first shock his vanity had received;

* Morand, page 102.

he was from this moment conſcious that Raw had kept him a ſtranger to his operation, and ſenſible of the full extent of the injury he had done to ſcience; by deſcribing, with ſo much confidence, an operation which he did not underſtand, he had led the whole profeſſion into a courſe of experiments full of danger.

Garengeot, who was tormented with an eternal deſire to learn every thing! to try every thing! to publiſh every thing! next made experiments ſimilar to thoſe of Morand. "We tried next day," ſays Garengeot, "four more operations, to aſcertain whether we could actually accompliſh the operation of Raw, as taught by Albinus: we tried whether it was poſſible to open the body of the bladder alone; but whatever pains we took in giving ſufficient curvature to the ſtaff, and in puſhing the biſtoury deep, with the deſign of ſtriking it into the extremity of the groove, we found inſurmountable difficulties; in every ſucceeding experiment, we approached nearer and nearer to the pudic artery, the wounding of which occaſioned the death of one half of the patients of Frere Jaques; the left ſide of the proſtate we never were able to avoid, and, in dividing it, we of courſe wounded the cervix; in ſhort it was rather from examining the internal than the external ſurface of the bladder, that we ſatisfied ourſelves of having opened the body of it. Thence we are perſuaded that Albinus never examined bodies operated on according to his own rules, and that, had Raw himſelf deſcribed his operation, he never would have ventured to affirm that he ſaved the urethra entire, and opened merely the body of the bladder! The knife can never reach the body of the bladder but through the urethra, except in theſe caſes of retention of urine, where the bladder, being greatly diſtended, projects on either ſide, and preſents itſelf to the knife *."

* "Nous fimes enſuite les deux jours ſuivans quatre autres opérations, pour voir ſi nous couperions ſeulement le corps de la veſſie, comme M. Albinus nous l'apprend de M. Rau: mais quelque précaution que nous aions priſe quelque courbée que fût notre ſonde et quelqu' avant que nous aions pouſſe notre biſtouri, à deſſein de faire entrer ſa pointe vers l'extremité de la rainure de la ſonde, et d'eviter par conſequent l'urethre; nous trouvions toujours de plus grands obſtacles; nous approchions toujours de plus en plus de l'artere honteuſe interne, dont l'ouverture a fait perir la moitie des tailles de Frere Jacques; nous n'avons jamais pû eviter la partie laterale gauche de la glande proſtate et par conſequent le cou de la veſſie; enfin nous avons toujours vû l'ouverture du corps de la veſſie plutot en dedans qu'en dehors. D'où nous concluons, que M. Albinus n'a jamais examiné de cadavres après cette opération; et que ſi M. Rau avoit lui-même rendu ſa methode publique, il n'eût pas avancé qu'il evitoit l'urethre pour n'attaquer ſimplement que le corps de la veſſie, puiſqu'il eſt impoſſible de

Conſcious of ſomething wrong, and thus aſſailed, Albinus could no longer refuſe thoſe explanations which the profeſſion required. Cheſſelden had declared it dangerous to attempt the operation which he had deſcribed; difficulties had been propoſed on all hands, and by Camper, his pupil and his rival, he had been queſtioned in a leſs friendly way; the beſt ſurgeons in Europe had attempted, in vain, to perform the operation which he deſcribed; ſo that ſome explanation was now due, both in deference to the public opinion and for the ſake of his own reputation.

Thus publicly and plainly charged with his raſhneſs, Albinus entered upon his exculpatory evidence, as the laſt ſolemn act of his life *. He denied the charge with vehemence, and claimed the privilege of explaining the words quoted by Sharp and Camper in his name †; and this is what he ſays: "I never did affirm that Raw cut the body of the bladder, but that ſuch was his deſign (propoſitum fuiſſet)." "This term, cervix, authors of various ages have underſtood variouſly. 'Le Dran and others underſtand it to be the beginning of the urethra, where that canal departs from the neck of the bladder.' The urethra, ſays Le Dran, aſſumes various names at the ſeveral diſtinct points; its beginning is named the neck of the bladder, and when the bladder is fully inflated, this neck forms a conical or funnel-like canal, leading to the bladder."—"Such," ſays Albinus, "is the deſcription of the part underſtood to be wounded by Raw ‡. What elſe indeed were we to underſtand? for Raw himſelf, when queſtioned concerning his operation, ſaid 'Legite Celſum;' and ſurely Celſus directs the neck of the bladder to be opened."—"I have," ſays Albinus, "in a patient cut by a ſurgeon of our city, ac-

faire la moindre diviſion à celui-ci, ſans que l'inſtrument tranchant n'entre par l'autre; à moins que ce ne ſoit dans ces grandes retentions d'urine, où la veſſie tendue comme un balon, ſe jette conſiderablement à droit et à gauche."

* De eâ quam olim prodidi, quum alia atque alia ſilente me ſcripta ſint, non committendum putavi, *ut à vitâ diſcedam priuſquam proferam quæ habeo.*

† Ignoſcant, rogo, viri egregii, ſi amor in eos meus non ſinit, ut adſcribi mihi vivente me patiar, quod non ſcripſi, quod mihi in mentem non venerat.

‡ "Cervix veſicæ, aliis collum, vocabatur principium itineris urinæ, quòd ab oſculo veſicæ procedit: quemadmodum ut ab aliis, ſic à Drane quoque, 'le canal,' inquit, 'qui eſt continu à cet orifice (l'ouverture de la veſſie) prend differens noms d'eſpace en eſpace à-meſure qu'il devient plus long. Son commencement ſe nomme le col de la veſſie. Lorſque la veſſie eſt ſouflée avec force, le col diſtendu par l'air qui le remplit forme une eſpèce d'entonoir continu à la veſſie.' Ac ſic intellexerat Sermes, locum incidendum indicans."

cording to the method of Raw, introduced my finger into the bladder, and perceived diſtinctly the orifice of it ſtill entire, the inciſion extending exactly to the orifice; to make ſuch an inciſion is much more difficult than to open either the urethra or the cervix, for this part of the bladder lies deeper, and is not ſo tenſe on the ſtaff *."—"One ſurgeon, of our city, Bortile, an ingenious and ſkilful operator, aſſuredly cut after Raw's method, though it is reported that he cut rather higher, the patient being laid more ſupine. His operations (ſays Albinus) I have often witneſſed, nor do I think there can be the ſmalleſt doubt that he cut at once the orifice of the bladder, the neck, and the contiguous part of the body. Cheſſelden, at the diſtance of many years, cut exactly the ſame parts. Perchet, Morand, Heiſter, and many others, cut not the body only, but alſo the cervix; and Heiſter, in an eſpecial manner, endeavoured to imitate, both upon the living and the dead body, the operation as he had ſeen it done by Raw. Our modern ſurgeons, beſides, continue to operate according to the deſign of Raw, and of Bortile after him. And I have myſelf (ſays Albinus) demonſtrated the ſame plan of operation to my pupils, on the dead ſubject, both before and after the biography of Albinus was made public †."

Thus had the common voice of the beſt ſurgeons and anatomiſts, in various countries, declared it impoſſible or dangerous to perform the operation imputed to Raw ‡: Albinus, ſtill alive, and in extreme old age, was called on to avow, or

* "Eamque partem incidere difficilius eſt quàm vel cervicem vel iter urinæ: nam et profundior eſt et non ita tenſa ſuper catheterem."

† "Eâdem quoque generaliter ratione quâ Rauïus, apud nos Bortel ſecabat, chirurgus noſtras, ut ſimplex, ſic peritiſſimus: ſecabat autem, ut aiebant, altius, nempe calculoſo ſupino. Vidi eum aliquoties ſecantem anno CIↃ IↃ CCXVIII; nec dubitandum eſſe putavi, quin cervicis multum, oſculumque, ac proximam veſicam incideret. Multiſque annis poſt, eundem demum locum Cheſſelden ſecuit; poſtque eum Perchet, et Morand, aliique. Et non ſolum veſicam, ſed cervicem quoque ejus, Heiſterus incidit, qui curationem quam Rauïum adhibere viderat in mortuis viviſque imitatus erat; eâque fere ratione, quâ aut Rauïus, aut deinde Bortel, ſecare noſtri perrexerunt. Eademque ſtudioſis medicinæ proceſſum curationis oſtendi in mortuis, tum ante editum à me indicem ſupellectilis, tum poſt.

"Non ſcripſi, incidendam veſicam à latere proſtatæ, quod Sharp de me tradit; non plagam veſicæ ſupra proſtatam infligendam, quod Camperus; ad quem certe locum cathetere Rauïi perveniri nequit, ut profecto non mirer facere non potuiſſe, qui ſic intellexerint: ſed ſcripſi, veſicam proxime cervicem ejus, ſive collum à latere, nonnihil inferiora et poſteriora verſùs, incidere propoſuiſſe, ubi certe proſtata incidenda eſt." *Albini Annotationes.*

‡ "Tous les chirurgiens qui ont fait la même tentative avec la ſonde, n'ont pû, non plus que moi, *parvenir à couper le corps de la veſſie ſimplement, d'où l'on a jugé que M. Albinus n'a pas bien compris la méthode de M. Raw;* car il

to refute, the charge of ignorance and imprudence, and moſt willingly would he have wiped off the reproach. But here, in his eagerneſs to exculpate himſelf from the charge, he mentions one proof which Camper directly and flatly contradicts. "Never, (ſays Camper,) while I was the pupil of Albinus, did he demonſtrate the parts wounded in this operation! Every year he performed on the dead body, and explained to his diſſecting pupils the operation of Raw, but, without demonſtrating the parts, or even opening the bladder from the ſide of the abdomen. Nor could I, from his inſtructions, form the ſlighteſt opinion on this point of ſuch high importance to humanity *."

Thus did Albinus, in his latter years, ſtrive to ſave his reputation from this notorious blunder; he tried by implication, and circumſtantial proof, to take off the force of words too plain to be miſunderſtood, and too deliberately pronounced to be recalled in any other way than by an open ingenuous avowal of his fault. His words made unhappily this uniform impreſſion on the minds of ſurgeons in all parts of Europe, that Raw did cut the body only of the bladder, behind the gland; it was known to Albinus, for many years, that on the ſole authority of his deſcription, this was univerſally believed †: "He acknowledges that he underſtood it to be the *deſign* of Raw to cut boldly into the body of the bladder, near the neck;" whether Raw was or was not able to accompliſh this deſign, whether he could open the body without in ſome degree touching the neck of the bladder, is a diſpute unworthy of a man of honour. Raw deſigned to open the body of the bladder, and all the ſurgeons of Europe endeavoured to follow his example; their career was interrupted only by the difficulties of that deep inciſion, by the dangers of it,

ne paroît pas poſſible que ce chirurgien conduit par la ſonde, ait pû éviter de faire du moins ſon inciſion en partie au col de la veſſie; ce qui eſt conforme à ce que M. Raw a dit lui-même pluſieurs fois lorſqu'on l'interrogeoit ſur les parties qu'il coupoit dans ſon opération: liſez Celſe, c'eſt tout ce qu'il répondoit." *Foubert*, page 663.

* "Albinus nunquam quo tempore ejus auditor fui, licèt quotannis lateralem Rauïi methodum in privatis ſcholis demonſtraret, atque in cadavere inſtitueret anatomen partium inciſarum, auditoribus ſuis oſtendit, veſicam ne quidem a parte abdominis aperiebat: nihil certi itaque, quod ad rem tanti momenti, humano generi adeo utilem ſpectabat, ex ejus inſtitutionibus determinare potui." *Camper*, page 14.

† The very title of Douglas's book implies the opinion of the profeſſion; his is "A HISTORY OF THE LATERAL OPERATION, or an account of the method of extracting a ſtone by *making a wound near the great protuberance* of the os iſchium, through the common integuments and levator-ani, into the ſide of the bladder, *without touching the urethra, proſtate gland, veſiculæ ſeminales*, or every other of the urinary or ſeminal veſſels, firſt attempted by Frere Jaques, in France, and afterwards ſucceſsfully performed by *profeſſor Raw*, in Holland, anno 1726."

and (melancholy to relate!) by the death of numbers of their patients. The reſult of Cheſſelden's experiments has been already explained: what may have happened in the practice of others leſs dextrous and leſs ingenuous, we do not know; but it is greatly to be feared that innumerable deaths are to be aſcribed to the precipitancy and vanity of Albinus, and to the mean and ſordid temper of Raw.

THE

OPERATION OF LITHOTOMY.

SECTION III.

Containing the Hiſtory of the Lateral Operation, Proofs of its Excellency, and plain Inſtructions for performing the Operation with the Knife or with the Gorget.

OF THE LATERAL LITHOTOMY INVENTED BY THE ENGLISH SURGEONS, AND NOW PRACTISED ALL OVER EUROPE.

It is gratifying to recollect that in our own country, England, there have not been wanting men, ſkilful in ſurgery and anatomy, who have improved this particular operation to the higheſt point, ſo that it is univerſally known among foreigners under the title of the Lateral Lithotomy, or Operation of the Engliſh ſurgeons. Of the ſcience and ſkill of thoſe Engliſh ſurgeons, we have reaſon to be proud, and ſtill more of their open, manly, and ingenuous manners; for, with the worſt examples before them, they acted the moſt generous part, not only diſcloſing their operation, but teaching it moſt aſſiduouſly to ſtrangers.

No ſooner was the biography of Raw publiſhed by Albinus, than it excited univerſal ſatisfaction to find, that an operation which was ſuppoſed to have died with its inventor, was ſo plainly deſcribed. This memoir found commentators in all countries; in England, the ſurgeons, eſpecially of the great hoſpitals, St. Bartholomew's, and Guy's, took a moſt particular intereſt in it. Douglaſs was the hiſtorian of what was doing among our neighbours, and preſented to the Royal So-

ciety a memoir, containing tranſlations of this piece of Albinus, and he produced at the ſame time a ſyſtem of diſſections to ſupport his reaſoning. "As ſoon," ſays Douglaſs, "as the book of Albinus was publiſhed at Leyden, he did me the honour, amongſt ſeveral of his ingenious friends here in London, to ſend it me in a preſent; and at the next meeting of the Royal Society, I thought proper to lay before them an abſtract, in Engliſh, of that part of it which relates to Mr. Raw's operation for the ſtone, together with ſeveral preparations, from which I demonſtrated and deſcribed the parts concerned in it *. So natural is the deſire of claiming inventions already announced to the public, that Douglaſs could not refrain from an attempt of this kind. "Of the ſeveral ways (ſays Douglaſs) of getting into the human bladder, I always reckoned that practiſed by profeſſor Raw to be one, long before I had heard any thing of his true method, or even of that of Frere Jaques;" and he adds, with exultation, that, "by his early tranſlation of Albinus, he had inſpired the ſurgeons of England with the deſire of rivalling the lithotomiſts of other countries †."

In the great hoſpitals of London, the high operation had hitherto been performed, when Bamber, in St. Bartholomew's, and Cheſſelden, in Guy's and St. Thomas's hoſpitals, adventured to perform his new operation, "each in the way that beſt ſuited his genius." Bamber ſervilely adhered to the text of Albinus; "he thought it proper to follow every ſtep of Raw's method, except that he filled the bladder moderately with water ‡;" while Cheſſelden, with a bolder hand and more adventurous ſpirit, ſought out a ſafer way of performing the inciſion.

* He goes on to ſay, "Theſe preparations I have had a good many years by me; they make part of a complete collection that I have made, by which all the poſſible ways of getting into the human bladder in order to extract the ſtone may, with the greateſt clearneſs, be illuſtrated, even the advantages and inconveniences of each of them, as far as they depend upon the ſtructure of the parts, with the greateſt certainty determined. *Of theſe ways I always reckoned that practiſed by profeſſor Raw to be one long before I had heard any thing of his true method," or even of that of Frere Jaques.* Douglaſs, page 81.

† "If I may judge by the event, what I then offered to the Royal Society was, by many members of that honourable body, thought no unſuitable entertainment for them; for, from that time, ſeveral worthy phyſicians and ſurgeons having carefully read Albinus's book, and examined my preparations, began to think ſeriouſly of introducing the practice of it among us. And I moſt willingly embrace this opportunity of doing juſtice to the ingenious Dr. Bamber, and Mr. Cheſſelden, by declaring, in a public manner, (what I had many opportunities of knowing, having aſſiſted at moſt of the experiments they made on dead bodies,) that, as it was their turn to cut in the two great hoſpitals of this city the following ſeaſon, I beheld with the utmoſt pleaſure the alacrity, induſtry, and application, with which they ſoon made themſelves maſters of this operation, *each in the way that ſuited his genius beſt.*" Douglaſs, page 82.

‡ Douglaſs.

It was believed that, if the incifion was made into the body of the bladder, the neck and proftate being fpared, no fiftula could enfue; and it was rumoured that Raw knew how to perform this diffection, and that it was to this peculiar method he owed all his fuccefs. Cheffelden had no information concerning Raw's method, but what tended to deceive him: he cut, according to this theory, deep into the body of the bladder, and his patients expired in great tortures: he was then confcious that the very form of incifion which was defigned to prevent fiftulas, was actually the caufe both of fiftulas, and of ftill more imminent dangers; and then it was that, refolving to judge for himfelf, he invented that operation which has been named the Lateral Operation ever fince. "Upon thefe difappointments (fays Cheffelden) I contrived the manner of cutting, which is now called the lateral way *."

In no long time the lateral operation of Cheffelden became as famous as the operation of Raw or Frere Jaques. Morand, then the moft celebrated furgeon in France, was ftruck with a great defire of vifiting England; and he came to this country not as an individual zealous in his profeffion, and willing to receive the inftructions of the firft lithotomift in Europe, but as the accredited envoy of the royal academy of France. "Hearing (fays Morand) of the great fuccefs of this operation, I propofed to the Royal Academy of Sciences to take the journey, in order to witnefs the operations of this lithotomift; and fo highly were the members pleafed with my defign, that it was agreed that I fhould travel at the public expence." The opportunities I had, in the year 1729, of feeing this operation in St. Thomas's hofpital, the queftions I put to the patients of Cheffelden, and the converfations I had with the operator himfelf, gave me conceptions which fpeculation alone never could have enabled me to attain. I refolved therefore to attempt the operation, which, though I believed more difficult than that by the apparatus major, I found infinitely more eafy."

A furgeon of this country muft read the encomiums of Morand with particular pleafure: "Cheffelden (fays he), after having overcome, by an effort of his mind, and for the good of his fellow-creatures, a natural repugnance to operations, performed this in particular with admirable coolnefs and furprifing rapidity; I have often feen him extract the ftone in twenty-four feconds, and indeed he feldom took more than one minute in ordinary cafes, where there was but a fingle ftone. He cut, while I was in London, twenty-feven patients without lofing one; the

* Anatomy, page 330.

twenty-eighth died; but even before this man died he had cut thirty-one patients: he had in three years cut ninety patients with unparalleled ſucceſs."

Morand returned to his own country, and all the ſurgeons of France were impatient to learn the reſult of his miſſion; among theſe Garengeot bore the ſuſpenſe with the worſt grace. He declaimed againſt Morand, Cheſſelden, and all the world; and as they declined inſtructing him in this new manner of operating, he took the privilege of ſaying that he had, by his natural ingenuity and diligent experiments, diſcovered the true operation himſelf. Douglas had affected to diſcover, unaſſiſted, the operation of Frere Jaques; Garengeot, in like manner, affected to have anticipated (yet it was only by two days) the diſcovery of Cheſſelden's operation. "We hoped (ſays he) to have our doubts reſolved by Mr. Morand, and to learn from him, by example, to perform the operation of Cheſſelden; but the happineſs of ſeeing him operate on the dead ſubject was reſerved for a few as diſcreet and ſilent as himſelf. We neglected not, in the mean time, to apply to ſome of our friends who were intimate with Cheſſelden for the needful information; but this celebrated ſurgeon only replied, that, having concealed nothing from Morand, and having even explained his operation in writing, he could ſay nothing, neither to friends nor ſtrangers, which might anticipate the memoir which Mr. Morand was preparing to preſent to the Academy *."

Thus it would appear that Morand had regarded this *confrère* of his as a buſy, meddling, reſtleſs creature, and treated his petulance with ſomething like contempt;

* "Auſſi-tôt que M. Morand fut de retour à Paris, nous crumes pouvoir verifier nos experiences, et apprendre de lui la méthode de M. Cheſelden; mais le plaiſir de le voir opérer ſur des cadavres fut reſervé à trois ou quatre perſonnes auſſi diſcretes que lui.

"Nous eumes dans ce contre-tems recours à quelques-uns de nos amis qui étoient en relation avec M. Cheſelden. Cet habile chirurgien leur repondit, qu'il lui avoit même envoyé ſa méthode par écrit, et qu'il ne pouvoit inſtruire ni compatriotes ni étrangers, que M. Morand n'eut donné à l'Academie des Sciences un mémoire de ce qu'il lui avoit envoyé.

"Mais DEUX JOURS APRES, je veux dire le 13 Mai 1730, tous nos doutes furent levés en voiant opérer M. Morand dans l'Hôpital de la Charité. Ce fut-là que nous reconnumes avec un vrai plaiſir *que notre travail et nos ſeules médiations nous avoient fait decouvrir la méthode de cet opérateur Anglois*, on pour mieux dire, la méthode de Frère Jaques exécutée avec plus de diſcernement. Toute la différence que nous remarquames entre la manœuvre de M. Morand et l'écrit que nous avions publié deux mois auparavant, eſt que ce chirurgien *ne retourna point le poignet, ni par conſequent le biſtouri pour entrer dans la veſſie.* Nous avons fait ſentir que notre méthode n'en cedoit en rien à celle-ci; c'eſt donc de ce que nous en avons dit qu'il faut tirer toutes les reflexions."

and that Cheſſelden had, on his part, acted with good faith to his friend Morand; but far from concealing an operation learnt at ſo much expence, and ſo intereſting to humanity, Morand made it public without loſs of time, and gave the lie to Garengeot, by teaching it aſſiduouſly to all his pupils; and almoſt all the younger ſurgeons in the cities and provinces of France had been his pupils. He particularly taught Le Cat, and held the ſtaff for him in his firſt operations, and he gives us a long liſt of the lithotomiſts who practiſed Cheſſelden's operation, and their various ſucceſſes. Mr. Dent, the ſurgeon in Dublin, was of the number of thoſe pupils, and had performed the operation upon twenty-three patients, of whom twenty-one ſurvived. The liſt of operations performed in Rochfort, Beſançon, Cadiz, Perpignan, Utrecht, Montpellier, Bruſſels, Bergen-op-Zoom, and other cities, proved that, of thirty or forty cut for the ſtone, no more than three or four died; at Bergen-op-Zoom, thirty were cut for the ſtone, of whom not one died *.

Thus was the lateral method, or the operation of the Engliſh ſurgeons, introduced into foreign countries, in a manner peculiarly honourable to the inventor; and abroad, as well as at home, the operation of Cheſſelden has been invariably preferred to all others, though it has been performed in a variety of ways. "In all the cities of France, (ſays Morand,) the ſurgeons practiſe Cheſſelden's operation; ſome with a knife like Cheſſelden's, ſome with the lithotome caché of Frere Côme; ſome with one inſtrument, others with another: but all practiſe his method in preference to the old."—"But Cheſſelden, truſting entirely to his knowledge of the parts, cut ſimply with the knife and ſtaff, and it is peculiarly intereſting to obſerve the ſeveral changes of his operation, and the motives which induced him to change. That we may at once have under review all the various ſtages of improvement, I ſhall analyſe, in diſtinct order, the ſeveral variations in the lateral operation, deducing it from the rude inciſion of Frere Jaques.

* Garengeot ſays; "Il eut été à ſouhaiter pour y réüſſir, de pouvoir tirer quelque éclairciſſement de M. Cheſelden lui-même, ou de quelque perſonne entenduë qui eut fait un récit de ſa méthode, et l'eut exécutée ſur quelques cadavres. *Mais le miſtère des uns et des autres* eſt ſi grand, *que juſqu'ici ni compatriotes ni étrangers* n'en ont pû rien apprendre."

This paragraph is a groſs and palpable falſehood, it is directly aimed at Cheſſelden and Morand; the one moſt liberally inclined and actually employed in teaching his operation, and practiſing it openly; the other induſtriouſly employed in learning, with the deſign of teaching it in France Morand being the deputy of a public body was in no ſhape amenable to Garengeot; and this paragraph was written in mere bitterneſs of ſpirit, when he found he had no opportunity of anticipating Morand. "This gentleman (ſays Morand) has a ſingular paſſion for writing on every thing, and before every body."

1ſt, Frere Jaques, rude and unſkilled in anatomy, ſtruck his knife into the hip, aimed at the body of the bladder, and generally reached the body of the bladder at that part which lies behind the proſtate. He was dextrous only in extracting ſtone: his operations were generally unſucceſsful: the good he did the profeſſion was, the proving that it was ſafe to cut, with the knife, thoſe parts which hitherto they had ventured only to dilate with the inſtruments of the apparatus major.

2d, When Frere Jaques had been taught, by Fagon and Felix, to reform his operation; in place of ſtriking his dagger-ſhaped knife thus all at once deep among the parts, he cut upon a grooved ſtaff, made his outward inciſions as we do, not by ſtriking the knife like a poniard into the hip, but by ſucceſſive longitudinal inciſions, and made his inward inciſion by cutting the proſtate gland and neck of the bladder upon the groove of the ſtaff.

3dly, Raw, ſkilful in anatomy, dextrous in ſurgery, and diligent in remarking the operations of Frere Jaques, learned from him, when he firſt appeared in Amſterdam, this operation of cutting behind the gland; and then it was proclaimed as the true theory of lithotomy, that, by cutting in the body of the bladder and ſparing the gland and the ſphincter veſicæ, no fiſtula nor incontinence of urine could happen, ſince thoſe important parts were left entire: to cut thus into the body of the bladder, behind the gland, was thought the moſt ſcientific and the moſt certainly ſucceſsful inciſion.

4thly, Raw could not long miſtake the principles of the operation; he muſt ſoon have diſcovered that an inciſion, thus deep among the cellular ſubſtance ſurrounding the rectum, an inciſion ſo oblique in which the external was ſo ill oppoſed to the internal wound, could not prevent fiſtulas, but muſt rather cauſe them; he accordingly diſcovered, by his own natural ingenuity, the danger of cutting into the body of the bladder; and by ſeeing Frere Jaques, upon his return to Holland, perform his new and more ſcientific operation taught him by Fagon, he was confirmed in his reaſonings: then his ſplendid ſucceſſes began; for then he cut, like Frere Jaques, the proſtate gland and neck of the bladder, upon a grooved ſtaff; but he put ſtill his finger on his lips, and when queſtioned by his pupils about the preciſe place and effect of this inciſion, he refuſed to anſwer, or only replied, "Legite Celſum." He thought his reputation at ſtake, and, though it was manifeſtly important to the profeſſion and to humanity, that he ſhould make known his true operation, he was ſo diſingenuous as to leave the world under the continued impreſſion

that the wound he made was ſtill in the body of the bladder! His ſecret went with him to the grave.

5thly, When Cheſſelden, diſſatisfied with the high operation which had hitherto been performed in the London hoſpitals, reſolved to imitate the operations of Frere Jaques and Raw; he had no guide but the deſcriptions of Albinus, who, though long the aſſiſtant of Raw, was himſelf deceived. The general perſuaſion was, that Raw had cut into the body of the bladder, behind the gland; and that his leaving the proſtate gland, the neck of the bladder, and the ſphincter entire, was the cauſe of his ſucceſs. An anatomiſt ſo ſkilful and enterpriſing as Cheſſelden could find no difficulty in making this deep inciſion, holding down the gut with his finger, and diſſecting till he came to the body of the bladder; he practiſed this method for a little while, but, in place of the ſplendid ſucceſſes of Raw, he found nothing but diſappointment, four patients, out of ten, died, and in the moſt miſerable manner. This was his operation in the year 1726 *.

* Douglas, the firſt who reviewed the biographical ſketch by Albinus; the firſt who tranſlated and commented upon it; the firſt who directed the attention of the Engliſh ſurgeons to the operation of Raw; the firſt who made ſyſtematic diſſections of the parts, was eager to claim theſe honours; he laid claim even to the diſcovery of Raw. Douglas, while he was buſy with theſe diſſections and tranſlations, was in haſte to explain the operation of Cheſſelden, before he underſtood it, and to claim peculiar honours for that operator, before his operation differed in the ſlighteſt degree from the firſt and worſt method of Frere Jaques. Douglas's hiſtory of Cheſſelden's operations in the year 1726 is this: "I have already mentioned an account of Raw's method given by Mr. Cheſſelden, in the 'Preface to his Treatiſe on the High Operation for the Stone,' publiſhed 1723, as he had received it from thoſe who had been ſcholars to Mr. Raw, and ſeveral times preſent at his operations. His informations were indeed very lame and imperfect, but yet, *even from theſe he had conceived ſo favourable an idea of that method, as to think it preferable either to that of Celſus or Marianus;* and withal that it would be ſtill more ſo, if the bladder was firſt filled with water."

"Albinus's late Treatiſe has, as I have already remarked, given this ingenious and moſt expert ſurgeon an opportunity of examining the whole matter with more clearneſs and certainty than he had done before; and the fruit of the pains he has been at, is not only to confirm him in his former favourable opinion of it, but alſo to bring it to ſuch a degree of perfection, as in his judgment makes it preferable to all the methods of cutting that have ever been invented."

"The patient being brought from his bed in a night gown, and ſituated in this manner, the operator thruſt an hollow grooved ſteel catheter through the urethra into the bladder, and with a ſyringe, mounted with an ox's ureter, injects as much warm water into it as the patient can bear without pain, in the ſame manner as is done in the high operation. Into one patient of about eighteen years of age, and who had a ſtone weighing ſix ounces and a quarter, Mr. Cheſſelden injected ſeven ounces of water; but he thinks the quantity may always be determined by the complaints of the patient, without obſerving any other rule."

"When the water is injected, and ſecured from running out, by tying round the penis a narrow ſlip of flannel, he gives the end of the catheter to an intelligent aſſiſtant to hold, whoſe principal care is to keep it from

6thly, Senſible that the ſufferings and death of his patients proceeded from theſe deep inciſions, Cheſſelden truſted no longer to the reports concerning Raw's operation, but to his own genius, and appealed from the authority of Albinus to the anatomy of the parts. He reſolved to cut no more by the ſide of the rectum ſo deep, but to cut, in place of the body of the bladder, the neck only, and the proſtate gland which ſurrounds it: The ſeveral ways in which he at various times performed this operation, the true lateral lithotomy, are extremely intereſting.

Firſt, after having forſaken the operation of Raw, when he firſt adventured on that operation (the ſlitting up the ſide of the proſtate gland), which was afterwards called the lateral method, he, after a free external inciſion, in which he cut betwixt the accelerator and erector muſcles, introduced two fingers to feel for the ſtaff, and hold down the gut; and, ſeeking out the membranous part of the urethra, he cut up that part of it and the ſide of the proſtate*. This was

riſing, but not at all to direct the groove to the place where the incision is to be made, for a reaſon that we ſhall hear preſently."

"Then the operator, having ſeated himſelf upon a chair, the height of which is ſuitable to that of the table on which the patient is laid, takes a pointed knife with a convex edge, and *beginning about an inch above the anus on the left ſide of the rapha, between the* accelerator urinæ, or, as I name that muſcle, conſtrictor urethræ, and the erector penis, he makes an incision *downwards, by the ſide of the ſphincter ani, a little obliquely outwards, as it deſcends from two and an half to four inches in length,* according to the age of the patient or ſize and ſtructure of the parts. This firſt incision he endeavours to make all at one ſtroke, ſo as to cut through the ſkin, fat and all, or part of the levator-ani, which lies in his way."

"As ſoon as this is done, he thruſts the forefinger of his left hand into the middle of the wound, in order to preſs the inteſtinum rectum to one ſide, that it may be in leſs danger of being cut, *and, taking a crooked knife in his other hand, with the edge on the concave ſide, he thruſts the point of it through the wound, cloſe by his finger, into the bladder, between the veſicula ſeminalis and os iſchium of the ſame ſide;* then, lowering his hand, he continues this ſecond incision upwards till the point of his knife comes out at the upper part of the firſt."

"This is Mr. Cheſſelden's regular method of cutting, and when no accident happens, which it was impoſſible to be aware of before the operation, he has been ſeldom above a minute (ſometimes leſs) between the beginning of the firſt inciſion and extraction of the ſtone." Douglas on Lithotomy.

At this time then it would appear that Cheſſelden had not yet invented the lateral operation, and was but occupied in imitating the operation of Raw, with no other difference than that of diſtending the bladder with tepid water.

* "This operation I do in the following manner: I tie the patient, as for the great apparatus, but lay him upon a blanket ſeveral times double, upon an horizontal table three feet high, with his head only raiſed; I firſt make *as long an inciſion* as I can, beginning near the place where the old operation ends, and cutting down between the muſculous accelerator urinæ, and erector penis, and by the ſide of the inteſtinum rectum. I then feel for the *ſtaff*, holding the gut all the while with one or two fingers of the left hand, and cut upon it

the operation defcribed by Cheffelden in the Appendix to his Anatomy; the operation which he taught to Morand, who merely tranflates the words of Cheffelden: "Je continue de couper de haut en bas entre les mufcles accelerateur de l'urine et l'erecteur de la verge et à coté de l'inteftine rectum. Je tâte enfuite pour trouver *le fonde, et je* coupe *la deffus le long de la gland proftate, continuant jufqu' à la veffie*, en affujetiffant le rectum en bas pendant tout le tems de l'opération avec une ou deux doigts de la maine gauche *." Whatever the private inftructions were which Morand received from the Englifh lithotomifts, they could not be fuch as to alter the defign of the operation, which plainly confifted, according to the exprefs words both of the mafter and of the pupil, in running the knife downwards and backwards through the thick fubftance of the proftate gland along the groove of the ftaff. It is very remarkable, that, having taught Morand this operation, Cheffelden commends it to his particular protection, faying (in one of his private letters, after Morand's return to his native country,) "that operation which I taught you, I am fure I never fhall have reafon to change;" and yet this favoured operation he did change, and that in the next feafon for cutting for the ftone! It was in the year 1731, the very year after Morand's return to France, that Cheffelden forfook his firft and approved operation, becaufe all his care in keeping the rectum out of the way of the knife was of no avail; he ingenuoufly confeffed to Morand, that, in running the knife backwards along the groove of the ftaff, he had twice wounded the rectum; there is reafon to believe that, while he felt the difficulty of making this incifion fafely, he was confcious that the incifion of the gland was often too fmall for the free tranfmiffion of the ftone.

Secondly, Cheffelden, reduced to the neceffity of abandoning not the principles of the operation but the manner in which it was performed, continued to cut the fame parts, viz. the membranous part of the urethra, and the proftate gland; but he cut them by moving his knife in a direction oppofite to that of his firft incifion, i. e. from behind, forwards; his incifion ending now, where, in his former operations, it had begun. The proofs of this mode of incifion are alfo intereffing, and I fhall deliver them. It is in a fecond hiftory of the operation by Douglas, dated Covent Garden 1731, that we find the true operation of Cheffel-

in that *part of the urethra which lies beyond the corpora cavernofa urethræ, and in the proftate gland,* cutting from below upwards to avoid the gut." Cheffelden's Anatomy. Appendix on cutting for the ftone, anno 1730.

* Morand, page 116.

den deſcribed *. He had felt the difficulty of making a ſufficient inciſion of the proſtate; he had experienced the dangers of wounding the rectum in cutting from the membranous part of the urethra backwards to the body of the bladder; and he reſolved now to diſſect till he reached the body of the bladder and felt the ſtaff behind the gland, and to open the whole length of the gland, by drawing the knife towards him along the groove of the ſtaff.

"In performing the lateral operation, he makes the firſt or outward inciſion, (ſays Douglas,) through the integuments, from above downwards, beginning on the left ſide of the raphe or ſeam betwixt the ſcrotum, and the verge of the anus, almoſt as high up as where the ſkin of the perinæum begins to dilate and form the bag that contains the teſticles, and from thence he continues the wound obliquely outwards, as low down as the middle of the margin of the anus, at about half an inch diſtant from it, near the ſkin, and conſequently beyond the great protuberance of the os iſchium.

"The firſt, or upper part of this inciſion is cut ſuperficial; after that, he *plunges his knife much deeper by the ſide of the rectum, and finiſhes it by drawing his knife obliquely towards himſelf.* Theſe three motions may always be obſerved in his external inciſion, but the laſt is performed pretty much at random; his knife firſt enters the groove of the *roſtrated or ſtraight part* of the catheter, *through the ſide of the bladder immediately above the proſtate;* and afterwards, the point of it continuing to run in the ſame groove in a direction downwards and forwards, or towards himſelf, he divides that part of the ſphincter of the bladder that lies upon the gland; and then he cuts the outſide of one half of it obliquely, according to the direction of the whole length of the urethra that runs within it, and finiſhes his internal inciſion by dividing the muſcular portion of the urethra on the convex part of the ſtaff.

"When he firſt began to practiſe this method *he cut the very ſame* parts *the contrary way*, that is, his knife firſt entered the muſcular part of the urethra, which he divided laterally from the pendulous part of its bulb, to the apex of the proſtate gland; and from thence directed his knife upwards and backwards, all the way into the bladder, as we may read in the appendix he lately publiſhed to the fourth

* Douglas, in his introduction to the Hiſtory of the New Operation of Cheſſelden, ſays, "Since the time of my firſt publication, viz. that in 1726, Mr Cheſſelden has, for very good reaſons, laid this method aſide and [illegible] another very different in its room, which he now practiſes with great applauſe and vaſt ſucceſs, having [illegible] patients out of fifty two."

edition of his book of Anatomy. But ſome time afterwards he obſerved that in that manner of cutting, the bulb of the urethra lay too much in the way, the groove of the ſtaff was not ſo eaſily found, and the inteſtinum rectum was in more danger of being wounded." Douglas.

Cheſſelden, with all the enthuſiaſm of an inventor, believed that he had diſcovered an operation which was not ſuſceptible of improvement; yet he himſelf changed the form or manner of his inciſion no leſs than three times in the courſe of a few years. 1ſt, He cut into the body of the bladder behind the proſtate, when he imitated Raw; 2dly, he cut another part of the bladder viz. the neck and the thick ſubſtance of the proſtate; this is his lateral mode of inciſion; 3dly, he changed a third time, not the eſſential form of the inciſion, but the direction in which he moved the knife; for in his *firſt operation*, when imitating the ſuppoſed operation of Raw and Frere Jaques, he ſtruck his knife into the body of the bladder, betwixt the tuber iſchii and the veſiculæ ſeminales, and all his inciſion lay behind the proſtate gland: in his *ſecond operation* he ſtruck his knife into the membranous part of the urethra, immediately behind the bulb, and ran it down through the ſubſtance of the gland; but his inciſion ſtopped at the membranous part or body of the bladder: but in his *third operation*, he, after very large external inciſions, ſtruck his knife deep into the great hollow under the tuber iſchii, entered it into the body of the bladder immediately behind the gland, and, drawing the knife towards him, cut through the whole ſubſtance of the gland, and even a part of the urethra, "cutting the ſame parts the contrary way." By carrying the foreſinger of the left hand before the knife in diſſecting towards the body of the bladder, he protected the rectum more perfectly than he could do in running the knife backwards along the groove of the ſtaff; and, by ſtriking his knife into the body of the bladder, and drawing it towards him through the whole thickneſs of the gland, he was ſure to make an ample wound.

But when he learned thus to plunge his knife thus deep into the hollow under the tuber iſchii, and puſh it into the body of the bladder behind the proſtate gland, and to make his internal inciſion by drawing the knife towards himſelf, one would imagine he were performing the very operation with the ſucceſs of which he had been ſo ill ſatisfied! By no means! The firſt and the laſt of his operations were eſſentially different; in his firſt operation he ſtruck the knife, in imitation of Frere Jaques and Raw, into the bladder, betwixt the veſiculæ ſeminales and tuber iſchii; he ſtopped at the back part of the gland; all his inciſion lay behind the gland; *he cut the body*

Plans of Cheseldon's Lithotomy.

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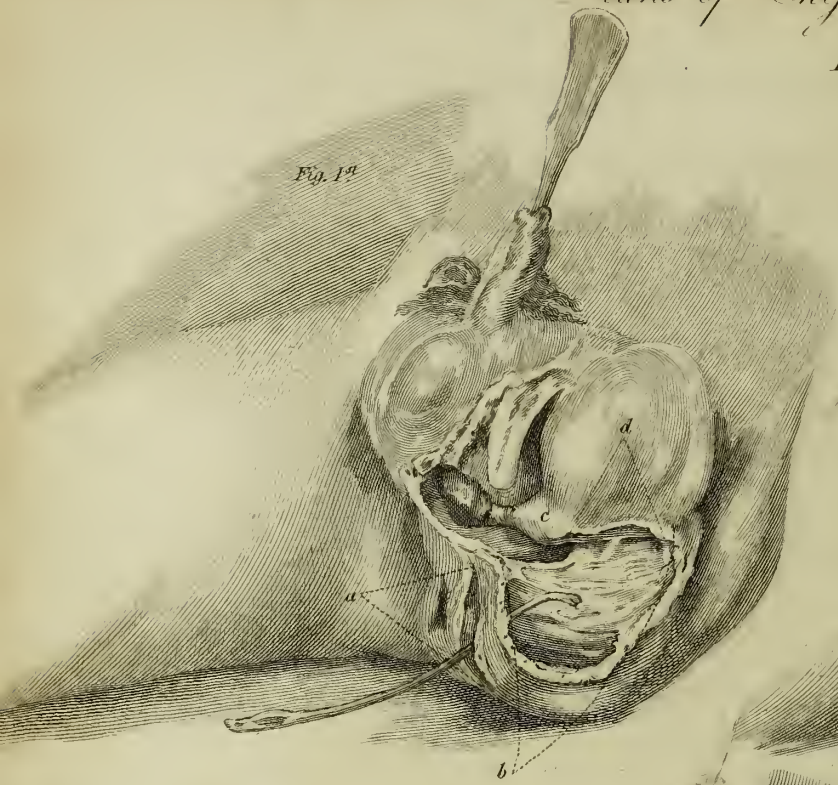
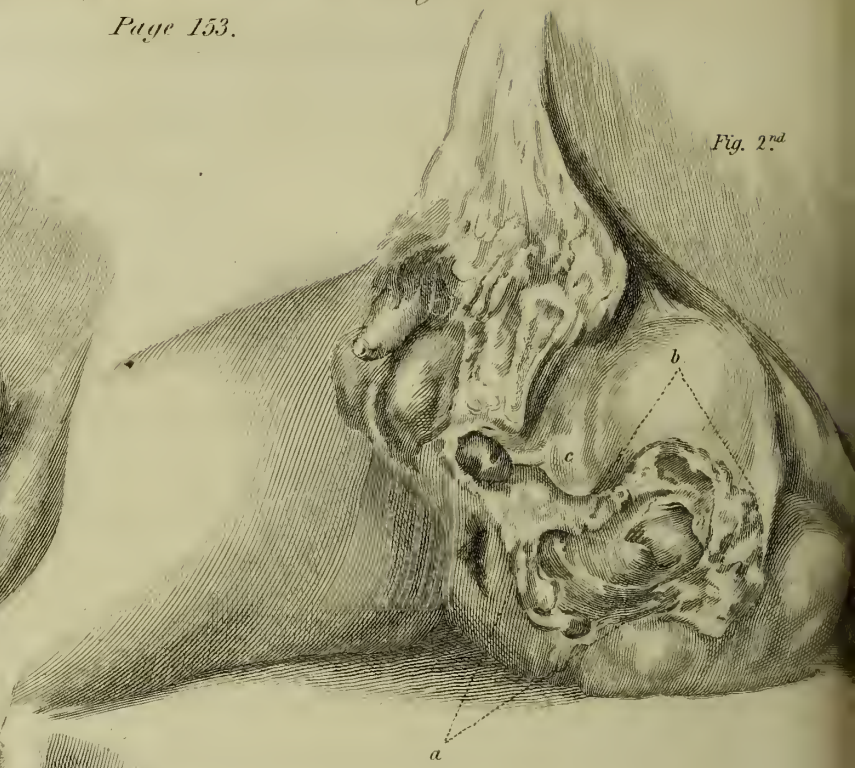
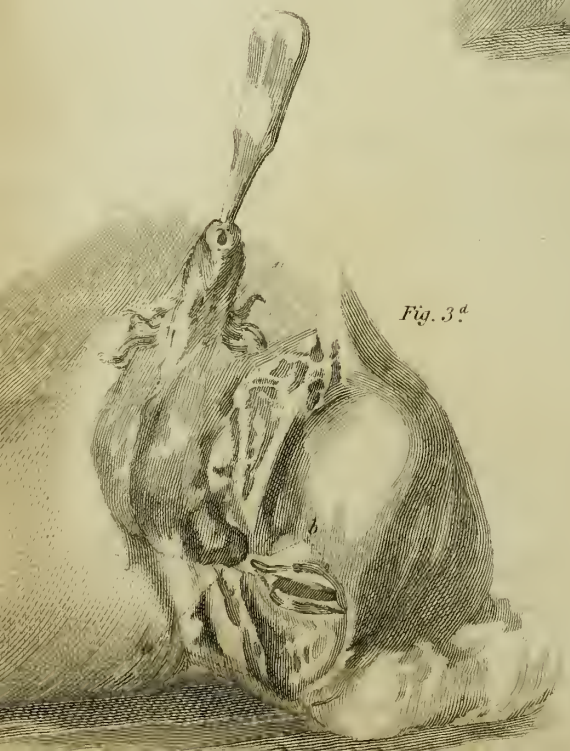
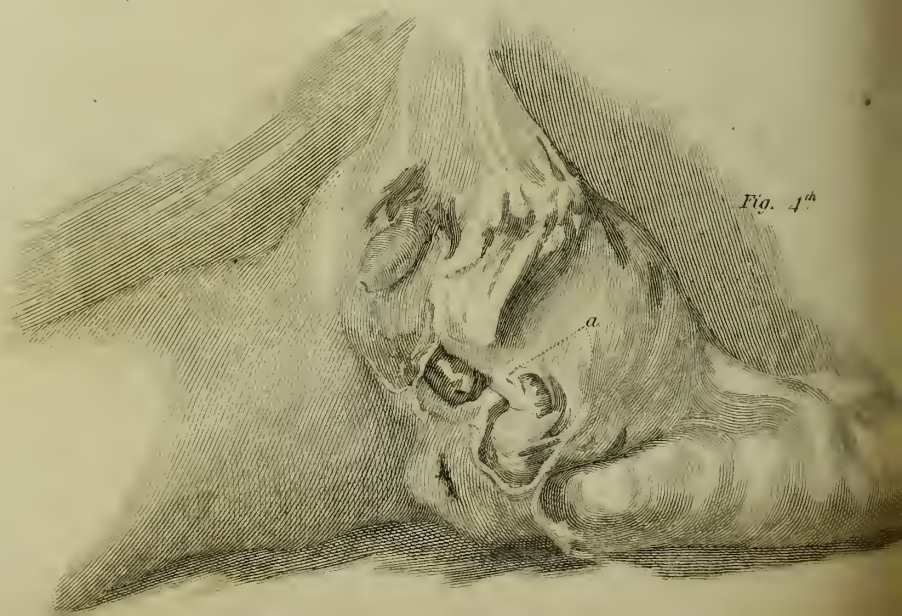








of the bladder only: but in his laſt operation, which all ſucceeding lithotomiſts have approved and practiſed, he cut no part of the body of the bladder; he entered his knife cloſe behind the proſtate gland, and, in drawing it towards him, he of courſe *cut only the neck of the bladder where it is ſurrounded by the gland* *.

And here let me once for all remark the difference betwixt the lithotomy of the French and of the Engliſh ſurgeons; for, while "they cut the ſame parts, they cut, them (to uſe once more the words of Douglas) the oppoſite way." The French cut, in imitation of Frere Jaques and Raw, from before, backwards; and differ in every circumſtance, in the poſture of the patient, in the form of the knife, and in the holding of the ſtaff, from the method of the Engliſh ſurgeons. The French ſurgeon kneels when operating, and his patient lies not horizontally, but reclining againſt the breaſt of an aſſiſtant. The French ſurgeon holds the ſtaff with the left hand, leſt the aſſiſtant ſhould diſplace it in the moſt critical moment of the operation; and in place of diſſecting gradually forwards, he, after the outward inciſion, plunges his knife into the hollow by the ſide of the rectum, and runs the point of the knife at the bent of the ſtaff. In place of uſing the common ſcalpell, the French ſurgeons have uſed a lithotome or knife, better accommodated to this mode of inciſion; it is conical, pointed, equally ſharp on both ſides, and reſembles an abſceſs-lancet, made faſt in its ſcales. The French operated in the following manner: The ſurgeon, holding the handle of the ſtaff in his left hand, uſed to feel with the forefinger of the right for the bending of the ſtaff, where it lies in the perinæum, the knife being in the mean while held in the mouth; then, taking the lithotome in the right hand, he made the outward inciſion with the edge of the knife, drawing the knife along like a common ſcalpell; then, plunging the point into that part of the hollow where he had marked the catheter, he ran the point of the knife, as ſoon as it had encountered the naked part of the ſtaff, (viz. juſt behind the bulb,) onwards into the bladder, through the body of the proſtate gland. Such an inciſion as ſhall by-and-by be explained, while it made too ſmall an opening in the gland,

* That this was the operation performed by Cheſſelden, I have already ſufficiently proved;—that this operation was underſtood univerſally in other countries, my reader will be eaſily ſatisfied by the following quotation: "Demittitur autem ſcalpellum in vulneris angulum inferiorem, quò poſt proſtatam veſicam primùm intret. Hinc etenim incipiendo, plagam veſicæ tam verſùs bulbam urethræ ampliat; diſſectis, hoc opere, ſiniſtrâ portione glandulæ proſtatæ, colo veſicæ, et parte urethræ membranaceâ." Keſſelring de Method. Foubertianâ. —This is the deſcription of a gentleman who had been in London, and who had ſeen the lateral operation five times performed by Mr. Ghirle at St. Thomas's hoſpital, Cheſſelden himſelf being preſent.

could not be accomplifhed without great danger to the rectum, for this efpecial reafon, that the left hand of the operator, in place of being employed in guiding the inward incifions and in preffing the rectum out of the way of danger, was occupied in holding the ftaff*.

The Englifh furgeon ufually fits at his operation; (but in this, I am a French Catholic, and would rather kneel †;) his patient lies quite horizontally, or even has his breech raifed by a pillow, which better expofes the perinæum and hip. Having once placed the ftaff and felt for it in the perinæum, he delivers it to the affiftant furgeon, who, by holding it, gives the lithotomift the ufe of both his hands. He cuts with the common fcalpell, becaufe his purpofe is, after the outward incifion, to diffect onwards through the cellular fubftance furrounding the rectum and bladder. After the great outward incifion, which goes through the fkin and cellular fubftance, he diffects, by fucceffive ftrokes, into the hollow under the tuber ifchii; preffes the rectum out of the way of danger, with the fore and mid fingers of the left hand; and with the forefinger, particularly, he judges of what he is diffecting, feels for the proftate, and diffects till he can diftinguifh the ftaff behind the gland, through the thin walls of the bladder: he then, in place of endangering the rectum, turns the edge of the fcalpell upwards away from the rectum, directs its edge fairly to the proftate gland, and cuts the whole length of it upon the groove of the ftaff. The French ufed a pointed knife, becaufe they performed the laft and moft critical part of the incifion by a fort of plunge, running the lithotome backwards into the bladder! The Englifh ufe a common fcalpell, and, in the moft critical part of the operation, turn the back of the knife to the rectum, and the edge to the proftate, which they divide by drawing the knife towards them along the groove of the ftaff.

The cutting of the proftate, then, is the effential part of the inward incifion; the more completely the gland is divided, the more eafy is the extraction of the

* "However, it muft be confeffed that this kind of knife feems beft calculated for their manner of cutting, becaufe, inftead of making three or four different incifions down to the neck of the bladder, as we practife in England, they firft divide the fkin, and then *continue to pufh the knife forwards* without once withdrawing it till the incifion is finifhed." Sharp, page 220.

† Cheffelden, or his pupil Sharp, who records thefe little peculiarities of the French and Englifh operations, does not remark the caufe of the difference of pofture, which is plainly this; that the pofture of the furgeon muft be regulated by that of his patient; the eye muft always be under the place of incifion; if the patient lie inclined with his fhoulders raifed, as in France, the furgeon muft kneel; if the patient be laid horizontally with his breech a little raifed, as is the practice in England, the furgeon *may* fit: but in either cafe I think it better to kneel.

ſtone; and as for the future conſequences of ſuch inciſion, or the healing of the wound, the ſuperiority of this mode of operating muſt be decided by comparing the form of the inciſion with the anatomy of the parts.—This compariſon of the forms of the inciſion with the parts to be divided is the laſt ſtep of that analytical proceſs by which I endeavour to inſtruct my reader, and to enable him to make his election: the ſuperiority of this operation will, I believe, be eaſily proved by very ſimple plans.

ANATOMICAL ANALYSIS OF THE OPERATIONS OF FRERE JAQUES, OF RAW, AND OF CHESSELDEN, BY WHOM THE LATERAL INCISION WAS INVENTED AND PERFECTED.

I have avowed it as my opinion, that, of all the operations of ſurgery, lithotomy is that in which the true principles of the operation may be moſt ſafely deduced from the anatomy of the parts. To conjecture *à priori*, which form of inciſion would be attended with feweſt dangers, would not be difficult; but now that we have before us ſuch a ſuite of experiments, performed in various countries by the greateſt maſters in ſurgery, and accompanied with ſuch authentic records of their various ſucceſſes, we are able, from experience as well as theory, to reſolve that important problem; "How we may, with leaſt danger, open our way into the bladder, for the extraction of the ſtone."

1ſt, There is no poſſibility of making a wound ſufficiently large for the exit of the ſtone, but by opening the great hollow by the ſide of the tuber iſchii, by cutting acroſs the tranſverſe muſcles, diſſecting deep among the cellular ſubſtance, and going right forward betwixt the rectum and the tuber iſchii, till we reach the bladder; in ſhort, there is no way of making a ſufficient opening for the exit of the ſtone, but by CUTTING UPON THE HIP: and I beg that my reader will carefully diſtinguiſh this from cutting upon the perinæum, as in the old operation of Marianus.

2dly, This hollow, where we ſeek for the bladder and proſtate gland, is filled with the looſeſt cellular ſubſtance, uniting the moſt membranous parts, viz. the coats of the bladder and rectum; and there is unfortunately ſo great a diſtance betwixt that part of the bladder which we aim at, and the external wound, that, cut how we will, the courſe of our wound muſt be more or leſs oblique, and an oblique wound among membranous and cellular parts is never void of danger.

3dly, When we aim at the body of the bladder behind the gland, we diſſect deep by the ſide of the rectum, and make a wound peculiarly oblique and unfavourable, from which the moſt melancholy ſymptoms enſue. Cheſſelden, for example, when he deſigned to imitate the ſuppoſed operation of Raw, preſſed the bladder low down with the ſtaff, and, having made his external inciſions, he ſtruck a long and crooked biſtoury into the body of the bladder, behind the gland. The wound being large and free, the extraction of the ſtone was not difficult: the patient ſlumbered out the two firſt days in perfect tranquillity and apparent ſafety; but, the cellular ſubſtance, in this long oblique wound, being infiltrated with urine, the parts never healed but ſuppurated, waſted, became fiſtulous, while ſometimes the peritoneum alſo partook of the inflammation, the abdomen was affected, and the patient expired in torments.

4thly, When, in place of aiming at this deep-lying part of the bladder, we aim only at the proſtate; when we open, by inciſion, the gland itſelf and the neck of the bladder, which the gland ſurrounds, we make the moſt favourable wound; then, in place of an oblique and deep inciſion, in which the external opening is at the greateſt poſſible diſtance from that in the bladder, we have an inciſion comparatively ſuperficial, in which the internal is nearly oppoſite to the external wound: in place of cutting into the thinneſt and moſt membranous part of the bladder, ſurrounded only by the looſe cellular ſubſtance, our inciſion paſſes through the thick and firm body of the proſtate gland, which, as it ſurrounds the cut part of the cervix, cloſes the inciſion by its ſwelling, puts the wounded ſurfaces in mutual contact, and affords, by its fleſhineſs, a ſubſtantial granulation for the healing of the wound. This ſwelling of the gland, which ultimately conduces ſo much to the cure, often cloſes the neck of the bladder ſo ſuddenly, that the patient begins to paſs his urine by the penis, even on the ſecond or third day after the operation.

Theſe general principles are admirably illuſtrated by the experiments and actual ſucceſſes of Cheſſelden, Raw, and Frere Jaques; and I hope to make the facts palpable and manifeſt by a few ſimple plans of the parts.

Figure 1. Is a plan expreſſing the courſe of the inciſion practiſed by Frere Jaques, before his operation was reformed, and by Cheſſelden too, in imitating the ſuppoſed operations of Frere Jaques and of Raw: (a) deſignates the length and place of the wound which is upon the point or apex of the hip; and to diſtinguiſh the outward wound, a probe is paſſed through it; (b b) marks the oblique courſe of the diſſection by which the lithotomiſt reaches the body of the bladder behind the proſtate

gland, which is marked (c); the extent of the wound in the bladder itſelf is marked (d); and the whole, or nearly the whole, length of the wound lies behind the gland, for it is made in the great lateral bulging of the bladder, immediately above the ureter and veſicula ſeminalis.

The conſequences of ſuch an inciſion are expreſſed in figure 2.; the ulcerated condition of the parts, on the third or fifth day, is here repreſented, and the reader is reminded of all the ill conſequences! firſt, of the diſtance betwixt (a) the external and (b) the internal wound, which is ſuch that the exit of the urine is difficult and ſlow, and its infiltration among the cellular ſubſtance almoſt inevitable! ſecondly, of the circumſtance the moſt approved by theoriſts, but really the moſt dangerous, viz. the proſtate gland being left entire; for the effect of the proſtate (c) being left entire and being inflamed and ſwelled is this, that not one particle of urine can paſs by the urethra, and every contraction of the bladder injects the cellular ſubſtance of the rectum with urine; thirdly, it is to be obſerved that the cellular ſubſtance, thus inflamed and ulcerated, is that which joins the membranous ſurfaces of the rectum and bladder; and that the thin edges of the cut bladder have ſo little ſubſtance, and are ſo little diſpoſed to granulate or heal, that urinous fiſtulas were frequent, and inflammation of the peritoneum and abdomen not uncommon, in the operations of Frere Jaques.

Figure 3. Is a diagram demonſtrating the excellency of that mode of inciſion which Cheſſelden practiſed from the time in which he began to think for himſelf; it is a ſcheme of the original lateral lithotomy of Cheſſelden which he performed with the knife. This is the very inciſion which has been practiſed by Frere Coſme, Le Cat, and others, who, though they have uſed knives of various ſhapes, have ſtill performed with them the ſame lateral lithotomy, and the ſame inciſion is made by the modern ſurgeon with the cutting gorget; it is an inciſion made into the neck of the bladder through the ſide of the proſtate gland, and named thence the lateral operation. Now this form of inciſion has theſe properties; firſt, the external wound is made, not entirely upon the hip at the greateſt poſſible diſtance from the bladder, but by the ſide of the anus (a), partly upon the perinæum, partly upon the hip, and directly over the ſpace occupied by the proſtate gland: ſecondly, the internal inciſion is made, not into the body of the bladder in the deepeſt part of the pelvis and at the greateſt diſtance from the external wound, but into the neck of the bladder at (b), through the body of the proſtate: thirdly, the plain deduction from this is, that neither in the time of operation is there the ſame immediate danger to the rectum, or to

the pudic artery, becauſe the lithotomiſt does not diſſect ſo deep, but cuts into the part of the bladder the moſt directly oppoſite to his external wound; nor, in the courſe of the cure, is there ſuch danger of fiſtulas or abdominal inflammation, for the plan proves that in this mode of inciſion the external and internal wounds are directly oppoſed to each other, and the courſe of the diſſection, not being ſo deep as in the other operations, is leſs oblique.

In figure 4., are more plainly expreſſed the excellencies and advantages of this inciſion; for, the whole length of the gland being cut, all formidable reſiſtance to the extraction of the ſtone is removed, and when the ſtone is extracted, the ſwelling of the bulky gland almoſt cloſes the wound; the urine begins to paſs by the urethra the ſecond or third day; and though, after the firſt ſwelling ſubſides, the urine paſſes again by the wound, yet, there being no opening in the membranous part of the bladder, the diſſection being neither deep nor oblique, the internal being directly oppoſed to the external wound, there is no infiltration of the urine into the cellular ſubſtance, and the gland, in granulating and healing, gives the internal wound the round form repreſented at (a), very different from that repreſented in fig. 2.

The diagram, No. 5., exhibits in epitome all theſe forms of inciſion, and illuſtrates in a particular manner the three ſucceſſive improvements of Cheſſelden's operation. His firſt error was in making his internal inciſion entirely behind the gland, from (a) to (b); his next improvement was to cut only through the body of the proſtate, to begin at the membranous part of the urethra, and ſtop at the back part of the gland, to cut, in ſhort, from (c) to (b); but ſoon finding that, by cutting in this direction, he could not make ſure of dividing the whole of the gland, and that by running his knife backwards he endangered the rectum and the pudic artery, he abandoned this method, and cut from behind forward, began his internal inciſion at (b) the poſterior part of the gland, and drew his knife forwards to (c) the beginning of the urethra; in performing this operation, he penetrated deep by diſſecting, ſtruck his knife into the bladder behind the gland, made his cut by drawing the knife towards him; "ending, in ſhort, this ſecond inciſion where the firſt began."

OF THE VARIOUS WAYS OF PERFORMING THE LATERAL OPERATION WITH THE TROCAR OF FOUBERT, THE KNIVES AND KISTOTOMES OF LE CAT, THE BISTOURI CACHÉE OF FRERE COSME, AND THE CUTTING GORGET OF SIR CÆSAR HAWKINS.

I have juſt reviewed the lives of thoſe eminent lithotomiſts from whoſe diſappointments, errors, and final improvements, I hope to draw the moſt uſeful leſſons: but, as ſkill in anatomy led to thoſe bold operations which were performed during laſt century, with ſuch memorable ſucceſs ignorance of anatomy has been the occaſion of ſurgeons, in latter times, ſeeking to avoid this curious, and, as they believe, dangerous diſſection with the knife, and of ſubſtituting in its place probe-pointed or beaked knives, which are conducted, by the help of grooved ſtaffs, through the neck of the bladder and proſtate gland.

Have we not reaſon to fear that our ſcience is on its decline, when, in place of cutting into the bladder boldly, the knife being guided by a knowledge of the parts, ſurgeons are willing to conduct their knife merely by running it along a grooved ſtaff? That ſuch a change implies a decline of ſcience and want of anatomical ſkill, is what I might perhaps be able to prove; but ſure I am, that I can demonſtrate dangers attending this blindfold ſtroke of the gorget, more truly terrible to a well inſtructed ſurgeon, than any accidental deviations of the knife: we cannot but remember how very much the reputation and actual performances of Cheſſelden and Raw have excelled the puny conceits and ſhort-lived fame of Le Cat, Frere Coſme, Hawkins, and other modern inventors. We cannot but lament, that the operation by which a ſurgeon can inſure ſucceſs proportioned to his ſkill and knowledge has fallen into diſuſe, while a rival operation, a blindfold ſtroke, the dangers of which are acknowledged even by thoſe who perform it, uſurps its place for no avowed reaſon, but that it can be as ſucceſsfully performed by the ignorant as by the ſkilful! Such mechanical contrivances would indeed be of ineſtimable value were it poſſible, in ſurgery, as in manufactures, to transfer the ſkill from the operator to the inventor, and to reduce the claſs of working-men from ſcientific operators to mere mechanics,—to men performing things which they do not comprehend, and contented with ſucceſs which they do not deſerve. Thus the

carver, or caſter in bronze, ſhapes a leaf with a ſingle ſtroke of a tool, which he never invented, or turns out from a die a bas-relief, which he has not even the ſentiment to admire, much leſs to model! by ſuch inventions have all the arts which are merely mechanical been facilitated and improved; but, ſuch a proceſs is too ſimple by far for the improvement of a ſcience which, in every particular act, requires intelligence and deſign.

The following queſtion, though of infinite importance to ſociety, far from being reſolved, has not even been propoſed:—"Is it ſafer to perform the operation of lithotomy with inſtruments ſo curiouſly adapted to each other by buttons and grooves, that the groove of the ſtaff may conduct the knife into the bladder without any nice regard to the ſize or conformation of the parts, juſt as a common directory guides a biſtoury?—or is it ſafer, to ſtudy the anatomy of the parts, to learn to diſſect them deliberately, and to cut the proſtate gland, not by a ſudden and blindfold puſh of the gorget or cutting director, but with the knife guided by the finger?" This queſtion will be eaſily reſolved, by reviewing the inventions of Le Cat, Frere Coſme, Foubert, and Hawkins; theſe were the firſt who deviated from the ſimple diſſection of Raw and Cheſſelden; they were the firſt inventors of grooved lithotomes, concealed knives, and cutting directors; their complicated and unhandy inſtruments exhibit a ſingular contraſt with the ſimple operations of Cheſſelden and Raw, and their achievements form a curious and inſtructive epiſode in the general hiſtory of lithotomy.

I am now entering upon a department of this ſubject peculiarly delicate, where, if I have an opinion different from that of the profeſſion, or think myſelf arrived at thoſe years of experience and knowledge, at the period of profeſſional reputation, which may enable me to form an opinion or entitle me to expreſs it freely, it becomes my peculiar duty to do ſo, however unfavourable that opinion may be to the operation now in common uſe. But whatever doubts I have concerning the ſuperiority of the modern operation ſhall be ſimply and honeſtly explained; nor will I allow myſelf to ſuppoſe that I can ſuffer the ſlighteſt blame for being true to my profeſſion, and diſcuſſing, with manly freedom, thoſe queſtions which are of univerſal concern, if only I diſcuſs them, as I proteſt I do, without ungenerous alluſions either to real misfortunes or to rumours of ill ſucceſs, without partiality or favour, or fear, or hatred of the living or the dead:—happily it is in my power to illuſtrate every axiom by reference to the ſchemes and practices of thoſe who are no longer ſenſible to praiſe or cenſure.

OF THE OPERATION OF M. LE CAT.

M. Le Cat, a ſurgeon of Rouen, in Normandy, is the gentleman whoſe orthodox faith and ſound ingenious comments on the aphoriſms of Hippocrates have been already celebrated; he was the firſt who formally and deliberately vindicated the principle of dilating the neck of the bladder with inſtruments, according to the analogy of the natural dilatation of the womb: he ſhowed ſtill greater ingenuity when he changed from his original practice of dilating the neck of the bladder, to the new operation of cutting the proſtate gland, without any apparent breach of principle, merely by the invention of a new term, by naming his inciſion of the proſtate "*Le debridement du col de la veſſie.*" When, at laſt, he was driven from ſuch evaſions, and forced to perform, along with all the profeſſion, the lateral inciſion of the proſtate; he operated with an apparatus ſo complicated, that to deſcribe his operation were very difficult, to perform it impoſſible; his reſtleſs genius for invention had ſuggeſted to him ſo many improvements, that he knew not himſelf, at any one period, with which of his knives he was operating *; his bag of inſtruments reſembled the confuſion of a lecturer's table, where ſpecimens of the idle inventions of various æras are tumbled in one heap; in all his theories and plans of operations, and in the groteſque ſhapes of his knives and conductors, there was an affectation of ſingularity, or rather a manifeſt depravity of judgment. When the ſimple operations of Raw and Cheſſelden were publicly promulgated, Le Cat, if he had been poſſeſſed of good ſenſe or ſound judgment, ſhould have been diſguſted with the puerile occupations of his former life! he ſhould have thrown aſide his complicated inſtruments, and applied himſelf, as he was an excellent anatomiſt, to learn the ſimple and manly operation of Cheſſelden with the knife and ſtaff! but it is a curious anecdote in ſurgery, it is mentioned with aſtoniſhment by Morand, and even by Le Cat himſelf it is acknowledged, that when Morand, juſt returned from England, taught him the operation, he would not perform it! For this he had not the apology of Garengeot: "Le myſterieuſe des étrangers et compatriotes." Morand put the ſmall lithotome or inciſion-knife of Cheſſelden into the hands of Le Cat, and held the ſtaff for him, and made him perform the operation, but he rejected the knife with the waywardneſs of a child, he ſought trivial apologies for

* "J'opérai *avec les trois eſpèces de mes inſtrumens*, le ciſtitome à tranchant diſcontinu, celui à tranchant continu, et le gorgeret-ciſtotome. Tous les reſultats furent exactement les mêmes."

not uſing it, and affected to prove that it was not fit for performing the inciſion of the proſtate *.

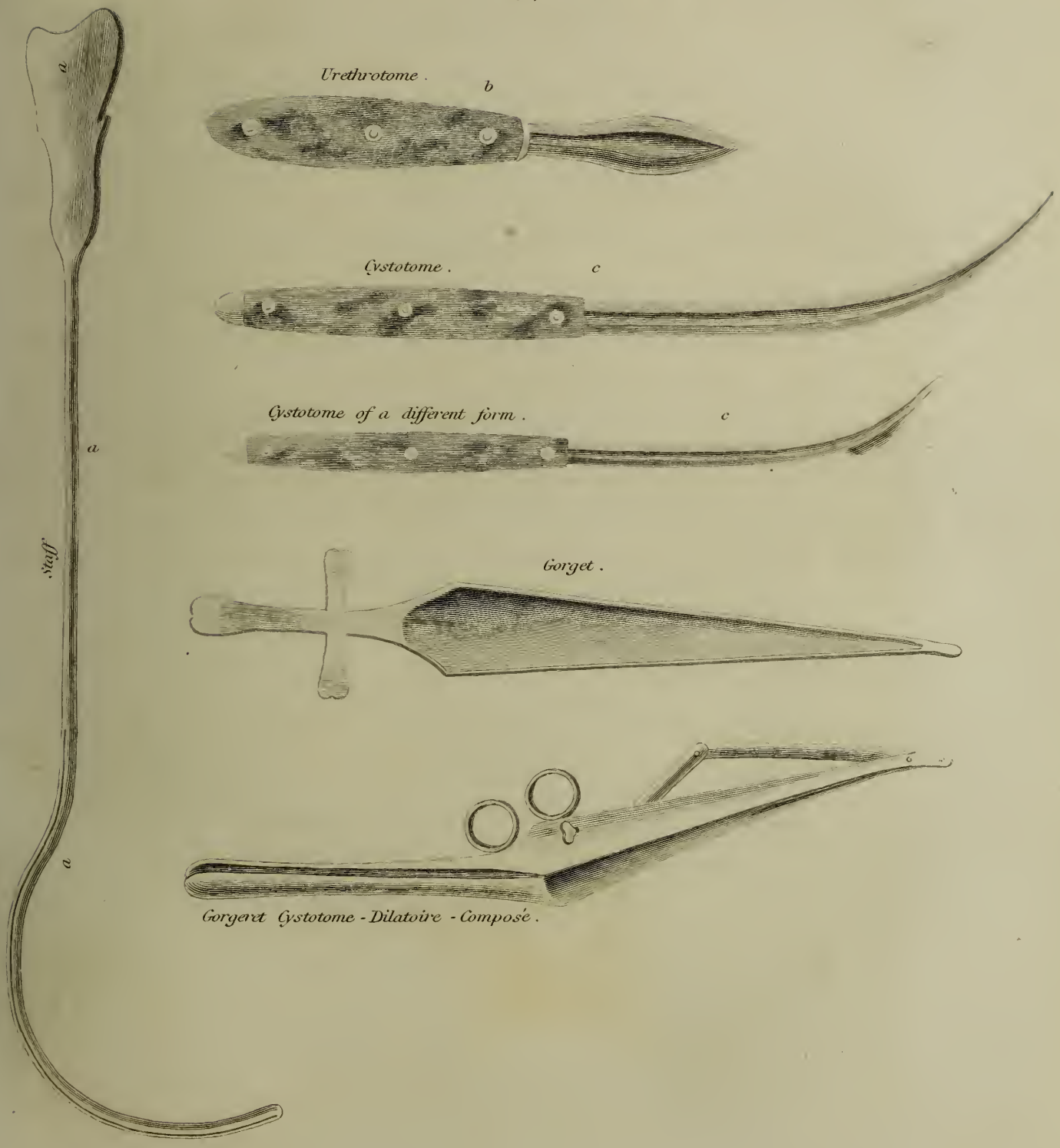
What was the iſſue of ſuch perverſe conduct? Le Cat's talents were loſt to himſelf and to the public; he never became a diſtinguiſhed operator; it was his fate to continue through life, writing volumes full of ingenious theories, the pages of which were never ſoiled by any finger, and to invent inſtruments ſtill more ingenious than his theories, which were never ſharpened for any hand, but his own: even in France, where every novelty has its admirers, Le Cat found no one to praiſe or follow him.

From the ſketches I have given of his inſtruments, my reader will perceive how complex his operation was. One of them, I mean the thing reſembling a gorget, was, in itſelf a whole armory. By raiſing a concealed knife, it made an opening into the bladder; by thruſting forward the canula or ſheath of the knife, it dilated the wound it had made; and when thus lodged in the bladder, it became a conductor for the forceps: this he intitles, with no ſmall degree of ſelf-approbation, his "*Gorgeret-Cyſtotome-Dilatoire-Compoſé*," a title which marks the genius of all his inventions.

Le Cat muſt indeed have had a ſubtile head, even to remember the ſeveral ſteps of his own operation, which was performed ſomewhat after the following manner: Firſt, he introduced his long big ſtaff (a), held, like that of Cheſſelden, by the aſſiſtant ſurgeon, and he cut forward with a common ſcalpell through the ſkin and fat, till he could diſtinguiſh the bulb, the naked urethra, and the proſtate gland: Secondly, with his knife (b) called Urethrotome, having a groove on one ſide, he opened the urethra juſt before the proſtate, and, fixing the urethrotome in the *groove* of the ſtaff, and holding it ſteady, roſe from the kneeling poſture in which he performed the outward inciſion; thirdly, holding the urethrotome in the left hand, he paſſes another knife, the ciſtotome (c), along the *groove* of the urethrotome, and, the beak of the ciſtotome being lodged in the *groove* of the urethrotome, it was puſhed forwards through the ſubſtance of the proſtate gland into the bladder; fourthly, drawing the ciſtotome a little backwards, he gave the ſtaff to an aſſiſtant to hold it ſteady, and, lifting a blunt gorget in the right hand, he laid the beak of

* "Il eſt vrai que le petit couteau de M. Cheſelden que mon célèbre et reſpectable maître M. Morand m'a mis à la main pour faire l'inciſion extérieure et intérieure tout de ſuite, eſt plus ſimple que mon uréthrotome et mon ciſtitome que j'y a ſubſtitué. Mais, 1°. Ce ſimple inſtrument fait avec peine l'inciſion extérieure, et il fait trop petite, dans l'adulte, l'inciſion des proſtates, ce qui l'a fait abandonner par M. Cheſelden même. 2°. Ce petit couteau ne coupe que d'un côté, et ſi l'on y retourne, à deux ou trois fois pour inciſer l'urethre on eſt obligé de le ſortir autant de fois de la cannelure."

Le Cats - Apparatus. Page 162.



Drawn by I. Bell.

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it in the *groove* of the ciſtotome, and ran it onwards till it glided from the *groove* of the ciſtotome, along the groove of the ſtaff, and was by the ſtaff conducted into the bladder! then, true to the principles of the apparatus major, and never forgetting his own peculiar theory, that there ſhould be "little inciſion and much dilatation," he bored in his finger along the gorget, dilated the neck of the bladder, and ſo prepared the way for his forceps.

This complex operation I regard as the moſt remarkable and guilty deviation from the dictates of common ſenſe and from the ſound principles of ſurgery; as the firſt attempt to ſubſtitute mechanical ingenuity for real profeſſional talents and ſkill. If the point had been to contrive an operation in mockery of both the old and the modern ſurgery, of the apparatus major, with its number of inſtruments, and of the lateral operation performed imperfectly by timid operators, with ſmall and trivial inciſions, this would have been the very thing required! It is equally a burleſque of both methods, for the apparatus is too complex to be correctly uſed; the inciſion, when made, is too ſmall to admit, without dilatation, even the introduction of the forceps, much leſs the extraction of the ſtone; and this inciſion, ſmall and ineffectual as it was, Le Cat performed by an unguided plunge of a cutting inſtrument, which, in ſuch a ſucceſſion of grooves, muſt have been apt to ſlip. Yet this operation, with all its ſeeming peculiarities, was eſſentially the inciſion of Cheſſelden, accompliſhed in that very way which Cheſſelden himſelf, with all his ſkill and practice, found peculiarly dangerous, viz. by running the knife backwards through the gland with imminent riſk of wounding the rectum and pudic artery.

OF THE OPERATION OF FRERE COSME,

A Prieſt of an Order conſecrated to the Charitable Duties of attending in the Hoſpital; ignorant, like Frere Jaques, of Anatomy or the Principles of our Science.

If we are to ſubſtitute mechanical inventions to real ſkill, let thoſe inventions be ſimple and plain, as Frere Coſme's was, who cut for the ſtone by performing the uſual outward inciſions, ſeeking out the membranous part of the urethra, opening it and introducing a concealed biſtoury, which was drawn out with the blade ſo

raiſed as to cut through the proſtate and make an opening in the cervix veſicæ, proportioned to the angle at which the knife was raiſed from its ſheath.

While Le Cat was in the full ferment of his inventive faculties, and thought he had diſcovered inſtruments which admitted of no competition, this Frere Coſme, an obſcure and uneducated man, communicated to the Journal des Sçavans de Verdun a ſhort letter, announcing his invention of a biſtouri-cachée, with which he imagined he could perform the inciſions for lithotomy without the ſlighteſt danger. This invaſion of what Le Cat claimed as his peculiar province, diſpleaſed him, and he wrote an anſwer full of invective and paſſion, proclaiming the ſuperiority of his own lithotome, and proteſting that it was as much a biſtouri-cachée as Frere Coſme's. Letter followed letter, till the replies and rejoinders amounted to a volume, full of ſound and fury, ſignifying nothing. The letters I have read, or tried to read, and never do I remember to have ſeen the delirium of polemical fury work up to ſuch a ferment, the combatants repeating, like drunken men, the ſame inſignificant things, without conſciouſneſs or meaning. Nothing can be imagined more trivial than any one letter, or more tedious than the whole. Frere Coſme, though he wrote many letters, never ſigned his name; during all the heat and fury of the conteſt, he was known by no other ſtyle than the anonyme; ignorant as he was, he attained (even before his name was made known) to ſome importance by this diſpute; had he been left alone, he and his biſtouri would never have been heard of, but he had the good fortune to joſtle in the dark againſt Le Cat, to whoſe vindictive, ſurly, and inſulting replies, to whoſe reputation and talents for polemical writing, Frere Coſme owed whatever degree of reputation he acquired.

Le Cat, having by his infuriated conduct raiſed up a rival, and by his rudeneſs procured him friends, came to be engaged in a diſpute not to be decided but by an appeal to the lithotomiſts and ſurgeons of the capital; they held a conclave on this queſtion, in which Martiniere, firſt ſurgeon to the king, preſided, the king himſelf condeſcended to take an intereſt in the debate, and received daily reports of the experiments made in hoſpitals upon dead bodies *; Mr. Louis was ge-

* "Pendant que je liſois le précédent mémoire aux ſéances de l'académie, le comité des lithotomiſtes, préſidé par M. de la Martiniere, faiſoit des expériences dans les divers hôpitaux de Paris. Ce chef de la chirurgie, ſi bien intentionné, ſi plein de zèle, avoit communiqué cet utile projet aux miniſtres, au roi même, et rendoit chaque jour compte à ſa majeſté de ce qui s'y paſſoit de principal. Ce grand prince, que ſa bonté caractériſera dans tous les ſiècles, s'intéreſſe à la vie de ſes ſujets au point de ne dédaigner aucuns des détails qui y ont rapport." Le Cat, page 102.

neral ſecretary of the conclave, while each member alſo kept his own private record of the facts. Le Dran, Morand, Foubert, Moreau, all the good ſurgeons of Paris were preſent; Le Cat was preſent in perſon, to perform his own operation; Frere Coſme was invited, but would not come, wherefore De Baſtide with others of his zealous pupils and friends were invited in his place *. The courſe of experiments began in the hoſpital of invalids on the 23d of February 1755, and was continued down to the 14th of March. The bodies were alternately taken in the theatres of the five principal hoſpitals, the Hoſpital of the Invalids, La Charité, L'Hotel Dieu, Salpetrie, and Bicêtre. There were ten ſittings of this committee, and the operation was performed, in all, fifty-one times. When the queſtion was thus brought to the deciſion of the knife, Le Cat performed his own operations, while M. Baſtide repreſented Frere Coſme: mutual accuſations of irregular and dangerous wounds were not ſpared, and the debate became more furious, now that the number of the combatants was increaſed and the anatomiſts with their quotas of retainers were fairly liſted in the field: The battle at laſt grew ſo loud and furious as to be no longer ſafe nor reputable, and a ſudden period was put to this unmannerly ſcene, without coming to that deciſion which Le Cat expected and claimed.

This was to Le Cat a moſt cruel diſappointment; after a turbulent life embittered by perpetual warfare, all his brilliant expectations ended in utter diſappointment. His innumerable improvements had ſo accumulated, that his method of lithotomy was ſuch as no one would be at the trouble of learning, or the hazard of performing. The value of the plain and ſimple inciſions of Cheſſelden, now practiſed in France by Morand, came to be univerſally acknowledged, and the imperfect lateral inciſion of Le Cat was neglected. The diſputes of Le Cat with Frere Coſme had excited ſo much of the ſpirit of intrigue, that the lithotomiſts were afraid to decide †; and ſo powerful were the parties engaged in the diſpute, that the very mention of his propoſed innovation was excluded from the memoirs of the Academy of Surgery. Even the name of Le Cat was not mentioned in the volume of that year, while the encomiums beſtowed by Louis on Frere Coſme are as extravagant and hyperbolical

* He was invited again and again, but no entreaties could prevail with him to come.

"M. le premier chirurgien du roi, l'a invite à nos expériences; ſes avances les plus polies ont été inutiles: la ſurpriſe d'un premier refus n'a pas empeche de faire de nouvelles démarches; elles n'ont pas eu plus d'effet."

† "Dans une réponſe, dont on m'honora le 8 Septembre on me rapelloit cette ſage maxime: *I aut être prudent et céder malgré nous au tems, en attendant des circonſtances plus favorables.*"

tropes as ever iſſued from the mouth of a Frenchman *; ſuch as ſhould have been offenſive to any man of correct taſte, ſuch as muſt have been very galling to Le Cat.

Yet Frere Coſme's was an operation infinitely more dangerous, a ſtroke of the knife leſs under the guidance of the ſurgeon than that of Le Cat. There needs no ſuit of experiments to prove thoſe dangers, which any one acquainted with the anatomy of thoſe parts might confidently foretel. The opening made in the membranous part of the urethra admits the biſtoury to the groove of the ſtaff; by the direction of that groove it is paſſed into the bladder; when lodged in the cavity of the bladder, the ſtaff is withdrawn, and the biſtoury lateralized, or, in other terms, turned with its edge towards the ſides of the bladder and proſtate: all this part of the operation is ſure and ſafe; but the moment the blade is raiſed from its ſheath, the uncertainties and dangers of the operation begin; if the biſtoury be introduced deep, the extremity of its blade wounds the fundus of the bladder †; if it be introduced but a little way, it divides the gland but imperfectly, and makes the extraction of the ſtone laborious; if the blade be turned much downwards, it cuts the rectum; if turned towards the tuber iſchii, opened widely, and drawn boldly, it divides the pudic artery ſo that the patient bleeds to death.

Each of theſe dangers is what might be predicted of this operation, and moſt unfortunately each of them is aſcertained by the moſt melancholy proofs: for Frere Coſme had, by this blindfold flaſh of the biſtouri, committed more butcheries than Frere Jaques, Le Raoux, and all the itinerant lithotomiſts! like them, he was ignorant, raſh, and unacquainted with ſurgery! Louis the panegyriſt of his operation found himſelf bound in honour to acknowledge the facts; and Frere Coſme was ſo ſecret in his operations, ſo jealous of admitting ſtrangers or any that were not entirely attached to him ‡, his conduct was ſo widely different from that of Frere Jaques or Le Raoux, that the Academy were naturally inclined to believe that there muſt be ſome danger where there was ſo much myſtery in the operations of

* "Il n'étoit pas queſtion de paroitre devant des juges, l'auteur du lithotome cachée auroit été le notre: perſuadé de l'excellence de ſon inſtrument, il ne pouvoit prevoir que plus de reputation et de gloire, en venant partager ſes lumieres avec nous."

† This danger is illuſtrated in the drawing I have given of Le Cat's lithotomy.

‡ "Il prend un grand ſoin d'opérer le plus ſecrettement qu'il lui eſt poſſibbe; il n'admit que des temoins aſſi les autant qu'il le peut; cette conduite eſt tout-à fait différente de celle qu' ont tenue Raoux, le Frere Jacques, et tous ceux qui ſe ſont donnés pour inventeurs de méthodes particulières. La confiance que quelques ſucces leur avoient inſpirée les portoit à augmenter le nombre des temoins de leurs procedes, ils cherchoient des approbateurs, le concours des ſpectateurs de leurs opérations etoient prodigieux."

this Frere Cofme, and were vindicated in receiving the following facts on the teftimony of various furgeons.

" Often the proftate was fo imperfectly cut, that the refiftance from the undivided gland occafioned a moft laborious operation ; fometimes Frere Cofme ftruggled in vain, for half an hour, trying to extract the ftone, and was forced to introduce the biftouri a fecond and even a third time, raifing the knife to a higher degree (for the rifing of the blade was graduated by a fcale) in order to make a wider ftroke." " In cutting M. de Chery, Lieutenant-Colonel of the regiment de Saintonge, he introduced his forceps twenty times, and, after having ten times brought the ftone to prefent under the pubis, at the lips of the wound, after exhaufting the patient with fruitlefs and dreadful attempts, he was obliged to introduce the biftouri again and enlarge the wound. The ftone was indeed extracted, but the patient died."—" Frere Cofme again, in cutting a prieft of St. Lazare, of Fontainbleau, laboured a full half hour in the extraction of the ftone; three feveral times did he introduce his biftouri, and repeated the incifion. This patient alfo died in twenty-four hours."

" When he cut Moreau, profeffor of philofophy in the college of Montaign; the forceps paffed into the bladder with the greateft difficulty, and that only after repeated attempts, and with the help of two buttoned probes or conductors The forceps were fix times introduced, and always with the fame difficulty, which clearly proves an imperfect fection of the proftate : the patient lay for half an hour under his hands; the hæmorrhagy was ftopped with great difficulty, and fo imperfectly, that on the nineteenth day the patient died."

" Frere Cofme had the ignorance to cut for the ftone a young man, in whom the ftone was fo lodged in the neck of the bladder that a fmall incifion with a common fcalpell, by cutting upon the gripe, would have faved him : yet in this cafe Frere Cofme had the cruelty, when making a fecond ftroke with his murderous knife, to gag the patient, and make his mouth be holden by a fervant of the hofpital to prevent his cries. This young man remained long fiftulous, and in all probability never was cured *.

* " Un jeune homme de vingt-un ans qu'il a taille à l'Hotel Dieu de la Ville de Nantes. La pierre éttoi engagée dans le col de la veffie ; il jugea qu' elle en rempliffoit exactement la capacite, et fe fervit de fon inftrument fur l'idee qu'il avoit prife due volume exceffif de la pierre ; apres des tentatives inutiles, il fallut revenir à l'inftrument tranchant. Le malade fouffrit beaucoup, et pour l'empecher de crier on lui faifoit fermer la bouche par un infirmier. Aprés un grand quart d'heure de travail, on tira la pierre, qui n'etoit point groffe, et pour l'extraction de laquelle on auroit du pratiquer tout fimplement le petit appariel, et fe fervir du crochet à curette dont tous les praticiens connoiffent l'utilite en pareil cas."

"The rectum was found to be cut on opening the body of a prieſt of the pariſh of St. Roch, cut by Frere Coſme."—"M. Boucot, ſurgeon at Troyes, acknowledged that, in dreſſing one of his patients cut by himſelf with the biſtouri cachée, air and fæces iſſued from the wound."

In many of Le Cat's operations, the great pudic artery was cut, ſo that the patient died almoſt immediately. In ſome caſes the greater branches of the pudic artery were divided, the bladder was ſo filled with clotted blood, as to occaſion a deſire to paſs the urine, with intenſe abdominal pains; the clotted blood being removed by injections of tepid water, the hæmorrhagy continued inceſſantly till the patient fainted and died. "A curate of the dioceſe of Sens, being cut in La Charité with the biſtouri cachée, bled profuſely; the bleeding was ſtopped by the introduction of a canula, but, returning three times during the firſt fifteen days, the patient expired on the ſixteenth, exhauſted with loſs of blood."—"Le Sieur Forceville died on the ſeventh day, of a ſlow hæmorhagy, which had never ceaſed from the moment of the operation."

"Frere Coſme performed his operation on Mr. Crin, judge of the city of Compiegne, on the 9th of November 1754. After many ineffectual attempts, he at laſt ſucceeded with the curved forceps in extracting a ſmall ſtone (weighing only half an ounce). The patient was, as uſual, laid in bed without any dreſſing, notwithſtanding a degree of hæmorrhagy from which he was very faint; two hours after the operation, the blood continuing to flow, Frere Coſme was forced to introduce a ſilver canula into the wound, wrapped round with agaric. About midday Mr. Crin deſired moſt importunately to be allowed to paſs his water. The bladder was injected with tepid water through the canula, which was then withdrawn; but by ſix in the evening, the hæmorrhagy having been inceſſant, the patient fell into faintings and expired in preſence of Frere Coſme."

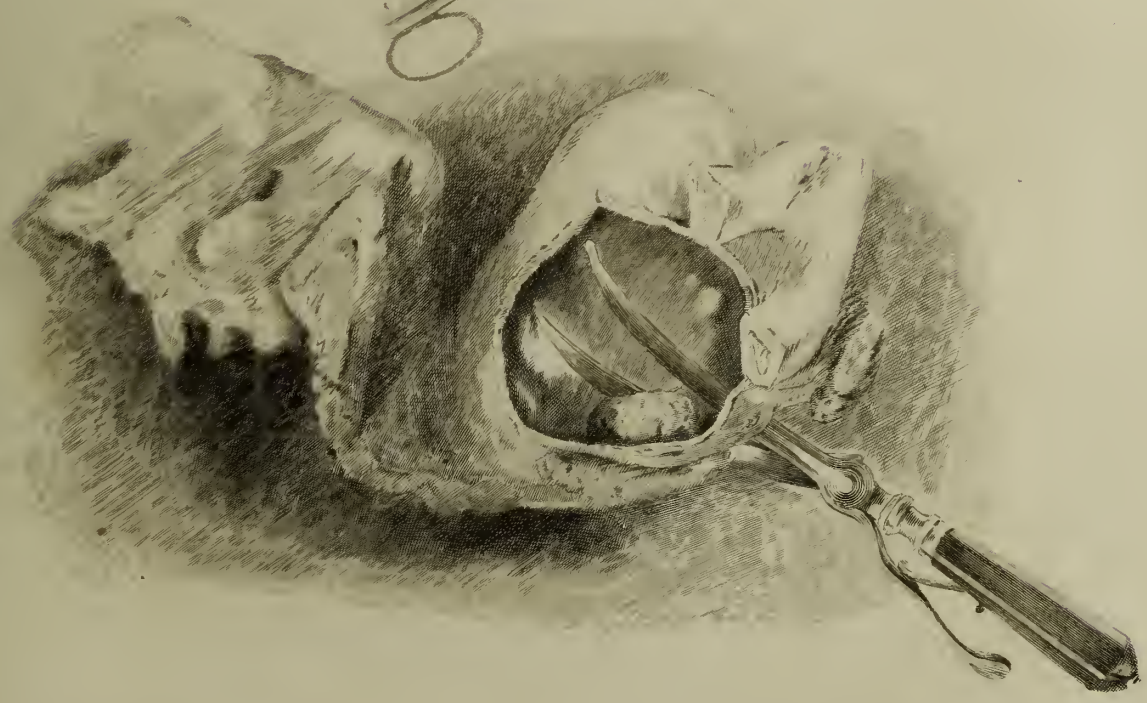
Theſe authentic and impreſſive facts will bring home a moſt inſtructive leſſon to the minds of thoſe who have ſuppoſed it poſſible to ſubſtitute mechaniſm to ſkill, and to forge inſtruments of ſo happy a ſhape as to perform a diſſection at one ſingle ſtroke. Theſe facts give the lie at once to all the vain promiſes of the inventor, who boaſted of this as the chief excellency of his invention, that the biſtouri cachée might be ſafely put into the hands of any ſurgeon, ſince it was guided as eaſily and ſurely by the moſt ignorant, as by the moſt ſkilful *.

* "Dela on a conclu que le nouveau lithotome pouvoit être mis avec confiance entre les mains de toute ſortes de chirurgiens, de différens degres de genie et d'adreſſe: que tous feront uniformement la même operation, ſans crainte de manquer de préciſion *qu'elle ſera executée auſſi parfaitement par l'homme qui a*

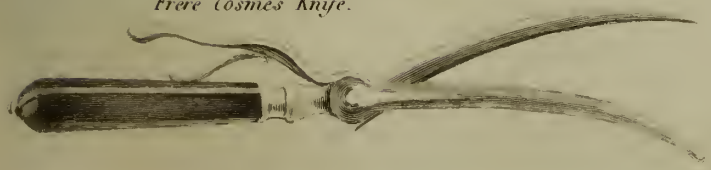
Sketches of Le Cat's & Frere Cosme's Operations. Page 168.

Sketch of Le Cat's Lithotomy.

Sketch of Frere Cosme's Lithotomy.



Frere Cosme's Knife.



Le Cat's Knife.

Drawn by I. Bell.

Engraved by E. Mitchell.

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He compared the biſtouri cachée with a pair of compaſſes, which, being opened to a certain degree, make circles of like diameters, whatever hand turns them; but he little conſidered the variety of ſize and texture of theſe parts in different ſubjects, and their mobility and variable poſture in all ſubjects, the ſlighteſt turn of the hand giving a different effect to the ſtroke of the knife. No graduation of the handle can regulate the inciſion among parts ſo moveable. In place of being an inſtrument equally ſafe in any hand, it is equally dangerous in the hands of the ſkilful and of the unſkilful. Nothing ſurely can be more inſulting to common ſenſe, than to ſay the virtue is not in the operator, but in the knife! yet it is no wonder the Friar boaſted of this quality of his knife, for in himſelf there was none! this was the only privilege he could lay claim to! If his knife was ſo contrived that with it any rude or ignorant man might operate ſafely, the inventor of ſuch knife was indeed entitled to operate! Frere Coſme did accordingly put this in the front of his eſſay, which was inſcribed, "THE DESCRIPTION OF AN INSTRUMENT FOR CUTTING FOR THE STONE, ADAPTED TO ALL CAPACITIES." *

OPERATION OF M. FOUBERT, SURGEON IN PARIS, AND MEMBER OF THE ROYAL ACADEMY.

When once the principle is openly avowed, of ſubſtituting mechaniſm to ſkill, and inventing inſtruments by which an operation may be performed even by the ignorant, all reſtraint vaniſhes, and one invention follows another in rapid ſucceſſion. This is a pleaſing and ready indulgence; ingenious trifles are eaſily invented; idle men are glad to find this ſhort way to diſtinction and celebrity, and well pleaſed to eſcape the labour of ſtudy. While the man of real knowledge, who ſtudies his profeſſion faithfully, and is familiar with diſſection, feels that he could accompliſh whatever he deſigns with the common knife, and thinks of no other; the indolent man inſpired, as he imagines, with a genius for inventing new

le moins d'experience que par lithotomiſte le plus conſommé. Ce ſont les propoſes expreſſions de ceux qui ont loué le nouveau lithotome.

* The title under which he deſcribes his knife is, "DESCRIPTION D'UN INSTRUMENT AVEC LEQUEL ELLE SERA FACILE À EXECUTER LA TAILLE PAR TOUS LES CHIRURGIENS."

operations and curious inſtruments, ſits and contrives ingenious things, which his friends never fail to praiſe, while all the world beſides diſregards them.

Foubert was one of thoſe, who, being deceived by the report of Albinus, believed that Raw made his inciſion into the body of the bladder only, and behind the gland, and he imagined that the beſt of all operations was that which ſaved the urethra and cervix veſicæ (viz. that part which is ſurrounded with the proſtate gland) entire *.

Foubert deſigned to make his way directly into the bladder by one ſtroke of the knife, without any of the uſual inciſions, and for this he invented the inſtruments which are here preſented along with the plan of his operation. He firſt paſſed the forefinger of his left hand into the anus to guard the rectum, by preſſing it aſide; he next, with the forefinger of the right hand, ſought out the tuber iſchii, and, having marked that point, he ſtruck a ſlender trocar and canula directly into the bladder, the trocar paſſing in the middle betwixt the anus and tuber iſchii, and he knew that it had penetrated into the bladder when the urine iſſued through the trocar: Then retracting the trocar a little, without drawing it quite out of the canula, he introduced the point of a ſlender knife into a groove or ſlit in the canula; by the guidance of that ſlit, he ran it onwards into the bladder, and was aware of the knife having actually reached the bladder, by the urine flowing ſtill more freely: Then, raiſing the knife from the ſlit of the canula, he made his inciſion, about an inch and a half in length, through the neck of the bladder, by moving the knife from that point at which it had entered upwards towards the pubis: And finally, by moving the handle more largely than the point of the knife, he opened the outer part of the wound to whatever degree the ſize of the ſtone ſeemed to require, and then, withdrawing the knife, he introduced a blunt gorget to guide the forceps. By the plan I have demonſtrated that his trocar entered behind the proſtate gland (a), above the ureter (b), and ſo paſſed into the body of the bladder. Foubert vainly imagined that he was at once imitating both the operations of Raw and of Celſus, and fulfilling the true theory of lithotomy, that whatever faults might be imputed to his operation, the danger of fiſtula could not be of the number, ſince the urethra and cervix were left entire. How vain ſuch expectations were, I have already proved: yet it was for this

* "Les reflexions que j'avois faites ſur la methode de M. Raw, telle qu'elle eſt décrite par M. Albinus, me firent entrevoir que la perfection de l'operation de la taille conſiſtoit à ne point intereſſer le col de la veſſie ni l'uretre, et a procurer à la pierre une ſortie par l'endroit le plus large de l'angle, que forment les os pubis; il me parut que le lieu le plus favorable pour entrer dans la."

Foubert's Operation — *Page 170.*

Drawn by I. Bell.

Engraved by E. Mitchell

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excellency chiefly that Louis commends Foubert's method, ſaying, " Les *voyes naturelles de l'excretion de l'urine* et de la matiere prolifique *ne ſont léſées en aucun maniere.*"

Mr. Thomas, another ingenious member of the Pariſian ſchool, improved Foubert's operation to the higheſt point of abſurdity, by ſtriking his trocar, not near the tuber iſchii, but into the higheſt point of the perinæum, cloſe under the pubis; reverſing the order of inciſion, he made, in a downward direction, that inciſion which Foubert had made from below upwards; and finally he joined to the canula a concealed knife, which, upon preſſing the handle, roſe out of a groove. Here all kinds of raſhneſs were effectually combined; the adventurous and unguided plunge of Frere Jaques was exemplified in the driving in of the trocar; the inadequate, and yet dangerous and irregular inciſion of Frere Coſme in this concealed knife; and, by directing the edge of this knife downwards, he multiplied all the dangers by turning it directly againſt the rectum and the pudic artery.

Our judgment on theſe inventions muſt be naturally guided by what we know of other experiments and other inventions. If it was dangerous to go ſo deep as Raw was ſuppoſed to do, although he made his way to the body of the bladder, by a deliberate and ſkilful diſſection; what muſt it not be to ſtrike a trocar into the pelvis under the pubis, without even a catheter (for Foubert uſed neither ſtaff nor catheter) to guide it to the bladder, and then, without any diſſection or any form of outward inciſion, to cut through all the parts with a flap-daſh ſtroke of the knife? We know from experience, in the operation of Frere Coſme, the dangers to which the rectum and the pudic artery are expoſed by ſuch a ſtroke; we know how inadequate the inciſion made by ſuch a movement of the knife is, to the complete ſection of the gland; we know that along with every other danger there is this peculiar to the unguided ſtab of Foubert's operation, that the operator may altogether miſs the bladder. Frere Jaques, when he plunged his dagger-like knife into the bladder, was guided by a ſtaff; he ſtruck his knife into the apex of the hip, and, by enlarging his wound downwards as well as upwards, cut fairly the muſcles of the perinæum, and provided a ſufficient opening for the exit of the ſtone: But Foubert, ſtriking his trocar by the ſide of the tuber iſchii, and cutting only upwards towards the pubis, failed to cut the tranverſe muſcle or to remove the chief obſtacle to the extraction of the ſtone.

It is a paramount objection to all thoſe operations in which the knife or other inſtrument is ſtruck thus at random into the bladder, that the ſurgeon finds much

difficulty in ſtriking the bladder with his trocar in the moſt urgent of all caſes, a ſuppreſſion of urine, ſuch as threatens gangrene, where the bladder, in ſhort, is ſo diſtended as to occupy the whole cavity of the pelvis, expoſing itſelf fairly to the ſtroke. Let it be always remembered by the ſurgeon, that the alternate fulneſs and emptineſs of the bladder and rectum ſo entirely changes the place and form of each, that it depends altogether upon the ſtate of diſtenſion of the bladder, what part of it you ſtrike with the trocar, or whether, in aiming at the bladder, you do not rather plunge into the rectum. From every conſideration, I hold it to be an indiſputable axiom that the operation of lithotomy never can be ſafely made a plunge in the dark, but muſt be a deliberate diſſection.

OF THE CUTTING GORGET OF SIR CÆSAR HAWKINS.

It is ſingular that the hiſtory of that operation which we now perform, or rather of that particular inſtrument with which we make the moſt critical part of the inciſion, is leaſt of all known. There is a taciturnity about the Engliſhman, which, even while he is proud of his invention, prevents any unſeemly ebullition of vanity; he contrives an inſtrument, finds it uſeful, his friends approve it, and he ſays no more about the matter. The invention of the lateral operation of lithotomy by Cheſſelden, though a moſt intereſting improvement, was but ſlightly mentioned by himſelf, or by his pupil the celebrated Sharp, but was fairly emblazoned by Morand. The invention of the cutting gorget by Sir Cæſar Hawkins was in like manner very ſlightly mentioned by Warner, and by Sharp, in his critical inquiry: but had it, like the operation of Cheſſelden, been deſcribed by the loquacious and eloquent members of the French academy, it might have made as ſplendid a figure as the biſtouri cachée of Coſme, or the gorgeret-ciſtotome-dilatoire-compoſé of Le Cat.

Of all the changes on the operation of lithotomy, the invention of Hawkins's cutting gorget was the leaſt obſerved, becauſe it was a change not in the deſign of the lateral lithotomy, but merely in the form of the inſtrument with which it was performed. There were, beſides, many previous inventions which prepared the public mind for the novelty; the inſtrument itſelf, the gorget, was not new, but had been long uſed as a dilator to enlarge the wound of the proſtate, and as a conductor

for guiding the forceps. The ſole change propoſed by Hawkins was to ſharpen the edge of the inſtrument, that it might perform, at once, the double office of knife and conductor, and ſurgeons were apparently pleaſed with a contrivance which ſaved them from the reſponſibility of diſſecting parts, with the anatomy of which all were not equally well acquainted;—experience alone has gradually proved how dangerous this gorget is.

"Mr. Serjeant Hawkins (ſays Sharp, p. 213.) ſeems to have fallen upon a moſt ingenious contrivance, not only for removing them (viz. the defects of the inſtruments uſed in lithotomy), but alſo giving the laſt hand towards perfecting the lateral operation; this he effects by making his gorget cut on the right ſide, ſo that when it is introduced upon the ſtaff and puſhed on into the bladder, it neceſſarily makes an inciſion on the left ſide of the urethra and proſtate gland, and thus avoids the danger of wounding the rectum; and, *as the internal inciſion is to be made in the ſame manner as when you propoſe to open the proſtate with the knife*, the extraction of the ſtone will be accompliſhed with all the ſame eaſe."

This operation is eſſentially the lateral operation of Cheſſelden and Morand; and the lateral operation, whether performed by the knife of Cheſſelden, the ciſtotome of Le Cat, the biſtouri cachée of Frere Coſme, or the gorget of Hawkins, is ſtill eſſentially the ſame, AN INCISION EXTENDING LATERALLY THROUGH THE PROSTATE GLAND, FROM THE MEMBRANOUS PART OF THE URETHRA, TO THE BODY OR MEMBRANOUS PART OF THE BLADDER.

In operating with the gorget, the external inciſion is made with the knife; the membranous part of the urethra is then opened, by turning the edge of the knife up towards the groove of the ſtaff; the beak of the gorget is then fixed in the groove of the ſtaff, which is to conduct the inſtrument into the bladder; the gorget, cutting laterally, is then thruſt forwards through the gland; and when the urine ruſhes out, which is a ſignal of its being thruſt home into the bladder, the forceps are introduced along the hollow of the gorget.

What objection then can there be, to an inciſion ſo fairly lateral, ſo apparently ſafe, ſo perfectly correſponding with the diſſection of Cheſſelden? Many! of which one is principal and concluſive: THE GORGET SLIPS! and all the ſurgeons of Europe confeſs it! it ſlips in the hands of the moſt ſkilful ſurgeons, and no one can be reſponſible for the conſequences of a thruſt ſo deſperate, and requiring ſo much force: it ſlips ſo frequently, and is avowedly ſo little under the controul of the operator, that no man ventures to blame his brother for a misfortune which may

happen in his own hand. So imperfect is the inſtrument, and ſo dangerous this plunge, that to prevent the gorget being driven through the fundus of the bladder, is a point of ſo much importance as to occupy, to this day, the genius of inventors, who have thought to guard the edge by a double or ſlipping gorget! and ſo far is the inciſion, after it is ſafely made, from being adequate to the extraction of the ſtone, that the ſize and form of the gorget, and eſpecially the expanſion of its blade, the broadneſs of its cutting edge, varies every day: The inſtrument was once conical, but is now cylindrical; it was once narrow, but is now broad; it was once double, with the beak in the centre, it is now ſingle, with the beak on one ſide; when firſt ſharpened by Sir Cæſar Hawkins, it was round, becauſe it had been immediately before a mere dilator; it is now flat and entirely reſembles a knife.

It is not without reluctance that I rank this among the inventions where mechaniſm is ſubſtituted to ſkill: If this form of inſtrument were found ſafe in practice, I ſhould be as little apt as any man to be infected by ſpeculative fears; but it is a murderous weapon! When the daſh is made with the gorget, either it is at once ſucceſsful, or, if wrong, is irretrievably ſo; for, though in operating with the knife you can make a ſecond inciſion, in operating with the gorget, if you fail in the firſt, you can make no ſecond plunge. The beſt operators of this country, among whom, I have no doubt, I may reckon Mr. Earle, acknowledge the dangers of this operation in the fulleſt and moſt unqualified terms: "I HAVE MORE THAN ONCE KNOWN A GORGET, THOUGH PASSED IN THE RIGHT DIRECTION, PUSHED ON SO FAR, AND WITH SUCH VIOLENCE, AS TO GO THROUGH THE OPPOSITE SIDE OF THE BLADDER." * I have myſelf ſeen it driven, God knows where, deep out of ſight, up to the hilt, without one drop of urine iſſuing, without the operator ever reaching the ſtone †. Obſerve but the force with which the operator drives in the gorget; mark the ſtruggle with which he diſengages the beak of the gorget from the groove of the ſtaff; hearken to the audible clack with which the beak of the gorget ſhoots off from the groove of the ſtaff; and if this moment of violence do not conſpire with the outcries of the unhappy patient to perſuade you of the dangers of this operation, you can have but little pretenſion to either feeling

* Earle on the Stone, page 53.

† One gentleman in this city printed (after an accident of this kind) his vindication with this motto, "Extenuate nought, or ought ſet down in malice." It has been my fortune to hear more than one vindication publicly read, but I cannot ſay I thought them elegant compoſitions. The common way, I believe, is beſt,—to ſay nothing about it.

or knowledge. Such is the rude violence with which the gorget is driven inwards, that Broomfield, even when operating with a blunt gorget, a mere dilator, burſt through the bladder and peritoneum; his gorget went almoſt beyond his reach into the abdomen, while the bowels of the boy fell down among his hands *.

But there is one paramount objection, independent of the many dangers which attend this puſh of the gorget; the inſtrument, guide it how you will, makes an inciſion inadequate to the eaſy extraction of the ſtone! I have often compared the inciſions I have made with the knife, and with the gorget, upon the dead body, and the ſketches which I ſhall preſently ſubmit to my reader will prove the fact. I have obſerved alſo, in the time of operating, how difficultly the opening of the proſtate admits even the forceps, how impoſſible that ſuch an imperfect inciſion ſhould eaſily allow the extraction of the ſtone. In all caſes of particular difficulty, where, uſing the privilege of an aſſiſtant, I have introduced my finger, I have felt diſtinctly the ſtricture of the gland, the greater part of it being left entire. The inciſion in the gland often admits the forceps ſo difficultly, that I am well aſſured the gland itſelf has ſometimes, by the mere puſhing of the forceps againſt this firm and narrow opening, been entirely ſeparated from the urethra! and after the forceps are puſhed ſucceſsfully through this narrow opening, and the ſtone catched betwixt their blades, all that remains of the gland is inevitably lacerated with much danger and pain. But I would more willingly quote any authority than that of my own diſſections or experience: Camper, who has ſtudied the ſubject, ſays, "Incredibile eſt quàm parva plaga ab omnibus etiam dexterrimis infligatur; nunquam forcipem robuſtam exciperet niſi dilataretur. Hawkenſius ſolo conductore, cujus margo dexter in aciem aſſurgit, idem præſtat; *omnes plagam dilatant, ut calculum extrahant: dilaceretur igitur ſemper veſicæ oſtium et proſtata.*" Page 14.

But higher and better authority remains behind. Deaſe was, if I judged rightly of his talents, a ſtern and rude ſurgeon, but perfect in all the theory and practice of his art; he was not very explicit in his communications with me, but, from his manner and the movement of his hand in demonſtrating to me, rather than from what he ſaid, I conclude that he cut after the manner of Raw, making the inciſion with the right hand, while he held the ſtaff with his left. "In all the trials (ſays Deaſe)

* Bromfield, like every other malefactor, has a ſpecial pleading on the relevancy of the libel. "I am of opinion (ſays Bromfield) that the elongation of this lateral ligament (viz. of the peritoneum) was occaſioned by the repeated ſcreaming of the child during the paroxyſms of the ſtone." page 270.

"Nec Deus interſit niſi dignus vindice nodus."

that I have made with the gorget on the dead ſubject, I never found the opening into the bladder ſufficiently large for the extraction of a ſtone of a middling ſize, without a conſiderable laceration of the parts. I have frequently taken the largeſt-ſized gorgeret, and could not find that, in the adult ſubject, I ever *entirely divided the proſtate gland, if it was any way large;* and in the operations that were performed here on the living ſubject, if the ſtone was large, the extraction was painfully tedious, and effected with great difficulty, and in ſome caſes not at all."

The gorget, like the knives of Le Cat and Frere Coſme, is a mechanical contrivance, for performing, at one ſtroke, an inciſion which ſhould be made with intelligence, by ſlow diſſection, large or ſmall, according to the proportions of the parts: It reduces the operation to the level of all capacities: It abrogates all diſtinctions, and puts the moſt ignorant almoſt on a level with the moſt dextrous ſurgeon: It inclines every young ſurgeon, who has but ſeen the gorget thruſt into the bladder, to undertake an operation, with the hiſtory, theory, or manual execution of which he is altogether unacquainted. If indeed this mechaniſm of the gorget and grooved ſtaff were ſo perfect that the worſt ſurgeon were really as capable of performing the operation as the beſt, there would be nothing to regret: but, unhappily, the theorem is expreſsly reverſed; the beſt and moſt ſkilful ſurgeon is in this affair little better than the moſt ignorant; no man who knows the danger of this particular operation, would declare himſelf reſponſible for the event. The gorget, if ſmall and narrow in the blade, makes an inciſion inadequate to the extraction of the ſtone; if made broad, that it may cut fairly through the whole body of the proſtate, it enters the pelvis with difficulty, paſſes cloſe to the bone, and endangers the pudic artery; and ſtill, however broad, does not fairly cut through the gland, nor make an adequate inciſion! It is the ſame blindfold ſtroke with the inciſion of Frere Coſme, having, beſide, this peculiar diſadvantage, that this peculiar form of knife, this cutting gorget is not firſt inſinuated into the bladder along the groove of the ſtaff, and then drawn outwards, with the ſingle danger of wounding the pudic artery;—but, is daſhed inwards upon the bladder, with the riſk of either ſtarting off from the groove of the ſtaff, and ſo miſſing the bladder! or of miſſing the bladder by puſhing the proſtate gland off from its connection with the urethra! or of plunging, not into the bladder, but into the cellular ſubſtance ſurrounding the rectum! or of being driven into the gut itſelf! or, worſe than all, of plunging through the gland, through the cavity of the contracted bladder, and through the fundus, among the viſcera of the abdomen.

Often, I am perſuaded, the lithotomiſt fails to ſeize the ſtone, from its having paſſed through ſuch a wound into the cavity of the abdomen.

One anecdote in ſurgery, one ingenious contrivance more, I do remember, and ſhould be ſorry not to commemorate. There was, in the time of Pallas, and while he ſtudied in this country, an Engliſh ſurgeon, whoſe invention he praiſes, but, in charity (as I would conſtrue it), does not mention his name; it was a pair of forceps with a deep groove, and in that groove a concealed knife. After making the uſual inciſions, this anonymous ingenious gentleman introduced his forceps, ſeized the ſtone, raiſed the concealed ſcalpell from its groove, and, turning the armed or ſharp blade of his forceps towards the perinæum, towards the lower angle of the wound, cut in proportion as he extracted, and could not fail to have a wound *perfectly ſufficient* for the paſſing of the ſtone. Pallas does indeed inform us, that various high conſiderations induced this ingenious ſurgeon to deprive the world of the benefit of this invention *. I wiſh a man of ſuch ineſtimable prudence had been alſo the inventor of Le Cat's gorgeret-cyſtotome-dilatoire-compoſé, of Frere Coſme's biſtouri, and of Hawkins's gorget! or that theſe ingenious gentlemen had been bleſſed with the prudence and charity of the inventor of the *cutting forceps*.

I will cloſe this diſcourſe with ſome thoughts of the celebrated Mr. Sharp, in his critical inquiry into the preſent ſtate of ſurgery. The paſſage I am now going to quote has greatly attracted my attention, becauſe I have been long perſuaded that many have been employed in inventing inſtruments, who would have been better occupied in learning to operate. Sharp ſays, "A reaſonable variety of inſtruments is an eſſential aid to ſurgery; yet it may be obſerved that this ſupplement to the hand has been ſo much attended to by moſt ſurgeons, *that dexterity itſelf has not been ſufficiently cultivated*; and it is very remarkable, that in proportion as the art of operating has been improved, the number of inſtruments has been generally retrenched. Dionis reflects on the ſuperfluity recommended by Scultetus; ſome of the moderns condemn Dionis for the ſame exceſs; and perhaps the future generation will diſcard many of thoſe now in vogue with the preſent age; I am *apt to believe that, ſhould they attain to a farther perfection in the art of operating*, than we are now poſſeſſed of, *it will poſſibly be as much owing to an acquired dexterity, as to any mechanical inventions*."

* "Multa vero ſunt atque varia, quæ hujus inſtrumenti uſum diſſuadent; et proculdubio perſpecta, autorem commoverunt ut non inventum publici juris fecerit."

This is an opinion to which I ſubſcribe with ſincere good will; I hold in reverence the ingenuity which affords us new reſources in a difficult ſcience; but I muſt ſee ſuch ingenuity founded on profeſſional knowledge before I can add my tribute of applauſe; I hold in contempt thoſe only who would ſubſtitute ingenious inſtruments to manual dexterity and a knowledge of the parts. There never was a man old and ſkilful in our profeſſion, who did not feel confidence only in his own hand and ſenſes; and this is rudely called prejudice! There never was a boy entering upon our profeſſion who had not a taſte, and, as he imagined, a talent for ingenious mechaniſm and new operations; a folly which has its natural cure in experience and real knowledge. Le Cat ſpent his life in trifling inventions, without ever being able to perſuade his meaneſt or moſt ſervile pupil to operate after his manner. Raw and Cheſſelden were careful only to be thoroughly acquainted with the anatomy of the parts, and deſired no more complicated apparatus to diſſect with, than a knife and a ſtaff. This is a fact, in itſelf, ſo convincing, that no argument could give it farther importance.

ANATOMY OF THE LATERAL OPERATION, AS PERFORMED WITH CHESSELDEN'S KNIFE OR HAWKINS'S GORGET.

We have reviewed a chaos of ſurgical projects, in order to arrive at the ſolution of this ſimple queſtion: "Since the lateral inciſion is plainly preferable to all others, will it be moſt advantageouſly performed by Cheſſelden's knife, or by Hawkins's cutting-gorget?" Every ſtep of this analyſis of the inventions of others has, I am perſuaded, enabled my reader to eſtimate more juſtly the value of the modern operation which I am now to explain; and to perform it with more deciſion and boldneſs, deducing the deſign and meaning of every ſtep from the variety of ways in which the ſame parts have been cut by others. What remains for me to do, is to compare the effects of the inciſions made by the knife and by the gorget, and I ſhall think I acquit myſelf of my duty very imperfectly if I do not enable my reader to cut with equal confidence with the gorget or with the knife.

The lateral inciſion of the Engliſh ſurgeons differs from the lithotomy of Frere Jaques, Raw, and Foubert. Theirs was, or was reputed to be, an inciſion into the body of the bladder behind the proſtate gland. Ours is an inciſion through

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the ſide of the proſtate, and is entirely the ſame whether performed by the compound-ciſtotome of Le Cat, the biſtouri of Frere Coſme, the knife of Cheſſelden, or Hawkins's cutting-gorget.

The ſuperiority of this operation is demonſtrated: We are now to decide whether the inciſion ſhould be performed with a knife or with the gorget; and, in reducing this theorem to demonſtration, I will not truſt to the trivial plans which I have hitherto uſed for illuſtrating the operations of the older ſurgeons. Such plans, however correctly imagined, are hypothetical merely! I am to repreſent the actual fact! I am to ſhow what form and extent of opening is produced, on one hand, by the puſh of the gorget, on the other, by the inciſion of the knife; having made ſketches from repeated diſſections of the ſubject, that I might not be deceived myſelf, I have drawn them of the full ſize of nature, that the young ſurgeon might not form falſe or imperfect conceptions of the ſize or relative poſture of the parts.

The drawings 6, 7, 8. are diſſections of the parts in the ſucceſſive ſtages of the operation of lithotomy.

Plate 6. is a drawing of the internal parts, i. e. the bulb of the urethra, the membranous part of the urethra, the proſtate, and the levator ani muſcle, preſented in the direction in which they lie to the operator. This is a moſt intereſting diſſection, ſince it indicates what is next to be done after the external inciſion. The ſtaff thruſt down through the penis is marked (a); the hair of the pubis (b); the ſcrotum, incloſing the teſticles, (c); the ſkin of the perinæum juſt behind the ſcrotum is diſſected up, and drawn aſide by the ſtring (d), ſo as to expoſe the diſſection of the urethra; the ſkin which covers the tuber iſchii is diſſected up, and held aſide by a ſtring marked (e); while the tuber itſelf, a great mark in our operation, is marked (f).

I ſhall now deſcribe, firſt, the parts lying in the perinæum, and next, thoſe lying in the hollow of the pelvis. The general body of the urethra, where it lies under the arch of the pubis, I have marked (g); the particular bulging named the bulb, and which lies along the perinæum, from the ſcrotum to the anus, I have marked (h); the muſcle which covers the bulb, named accelerator, is diſſected up and held aſide by a thread; the horn or tendon of this accelerator muſcle is marked (i); and the body of the muſcle, where it is held aſide to ſhow the bulb, is marked (k). (l) marks the arch of the pubis; the tuber iſchii is marked (f); one of the muſcles

of the back of the thigh, arifing from the tuber ifchii, is markc (l); the fmall mufcle of the penis, named the erector, is marked (m).

The parts within the pelvis are efpecially important: in the great hollow of the pelvis under the tuber ifchii and behind the pubis, lies the proftate gland; the membranous part of the urethra is, in this drawing, covered by the bulb, the pendulous part of which lies before it; the gland, marked (n), is feen immediately behind the bulb, under the arch of the pubis and above the rectum. The bulb, the anus, and the rectum, are pulled a little out from the pelvis, to fhow the extent of the powerful and flefhy mufcle, the LEVATOR ANI. The opening of the anus is marked (o); the fphincter ani, mixed with maffes of fat and cellular fubftance, immediately furrounds the verge of the anus, and is marked (p); the great mafs of the levator ani mufcle, covering the rectum, is marked (g); one fafciculus of fibres, more clofely covering the proftate gland, is marked (r); and let it be remembered that from this edge (r), a confiderable portion of the levator was cut away to expofe the gland and uncover the membranous part of the urethra.

Thefe parts, lying in the perinæum and pelvis, are viewed in this drawing fomewhat obliquely, and are nearly in the pofture for lithotomy. Firft, it will be remarked that the bulb lies fo before the membranous part of the urethra, that you cannot eafily reach the membranous or naked part, but by a lateral diffection. Secondly, the young furgeon muft remark that the ftaff, in performing the operation of lithotomy, is to be felt for, not by turning the finger towards the bottom of the wound, towards the deepeft part of the diffection: I have remarked that thofe, unaccuftomed with lithotomy, ufually feel for it there, and are long perplexed by not finding the ftaff, which is only to be difcovered by turning the left forefinger upwards; it is then felt at the upper angle of the incifion, clofe under the arch of the pubis. Thirdly, the operator fhould feek to lay bare a confiderable part of the urethra and proftate gland, before he prefumes to make that incifion in the urethra which is to admit the beak of the gorget, and therefore, in operating with the gorget, he fhould diffect the parts as completely as if his defign were to operate with the knife. Fourthly, he muft remember that the hollow of the pelvis, in which thefe parts lie, is very deep, and is, in a lufty perfon, filled with much fat and cellular fubftance; that after opening the fkin and cutting the perinæal mufcles, after the forefinger of the left hand is admitted very deep into the hollow, under the tuber ifchii, there is ftill an important part of the diffection to perform,

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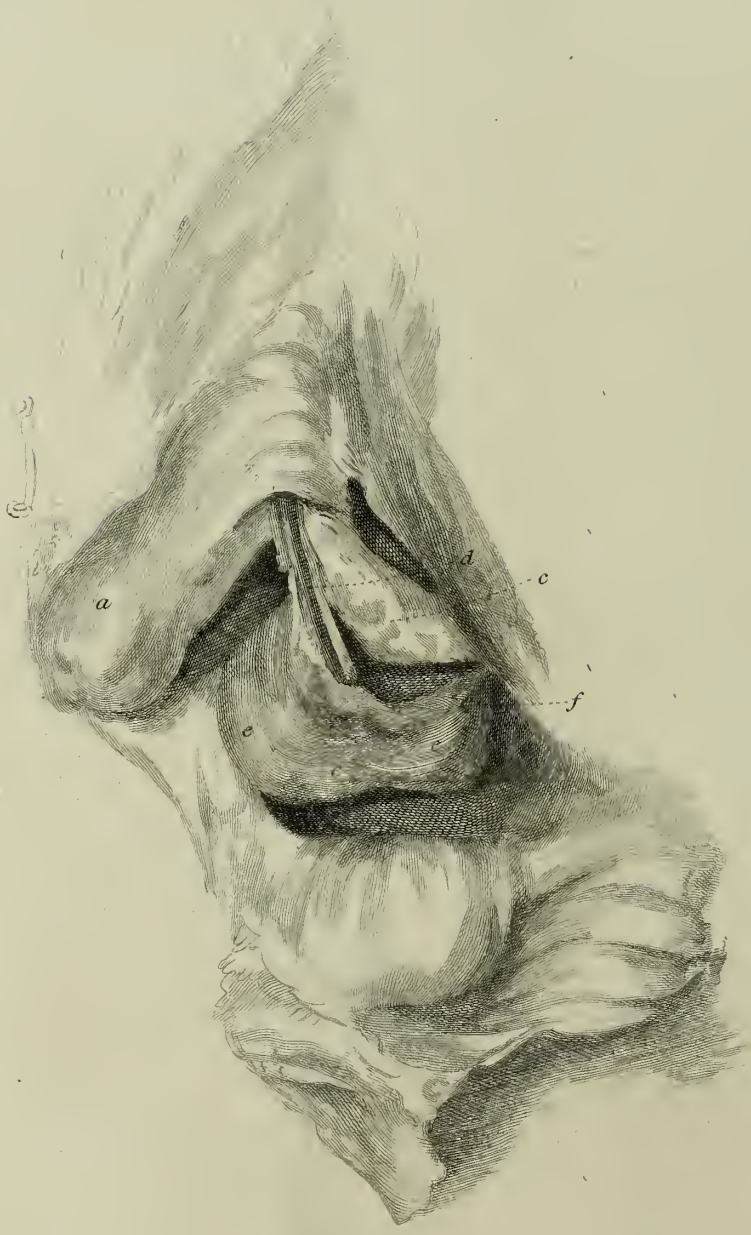

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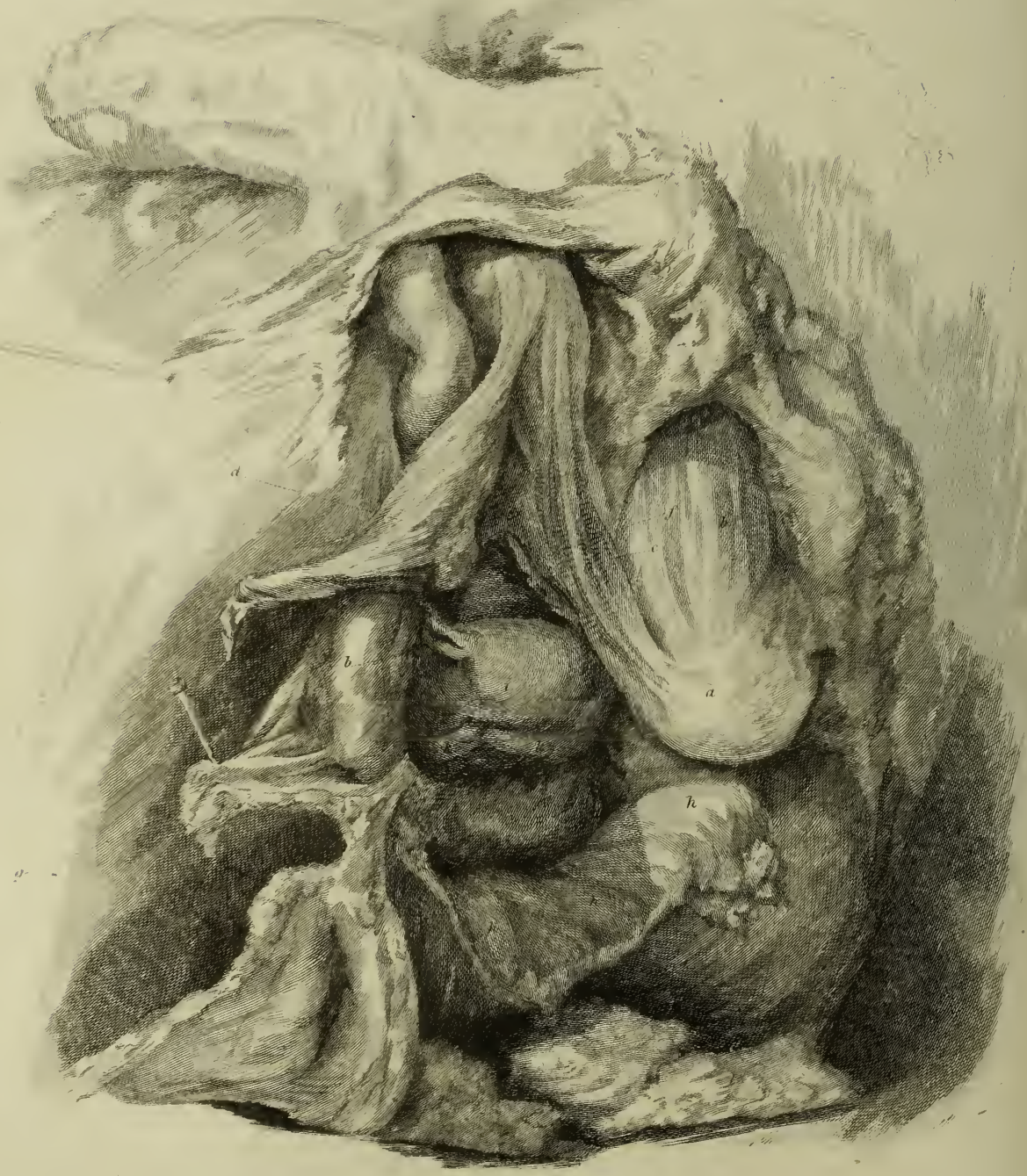

W. Skelton sculp.t

J. Bell delin.t

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viz. the diſſection of the levator: for the levator ani ſo covers all thoſe parts, that unleſs it be fairly diſſected, the proſtate gland cannot be diſtinctly felt, and unleſs it be diſtinctly felt, and the membranous part of the urethra laid quite naked, it is impoſſible to make a clean and neat inciſion into it, for admitting the beak of the gorget. If the levator is left imperfectly diſſected, the fibres of the muſcle are apt to cloſe over the ſlit made in the urethra, and prevent the beak of the gorget being fairly admitted into the groove of the ſtaff; it is to this I attribute the accident of the operator often miſſing that inciſion of the urethra which he thought he had made ſo freely. The diſſecting of the urethra and gland very clean prevents all ill conſequences, and never can do harm. The young ſurgeon will alſo remark, in this drawing, the pudic artery, where it runs along under the arch of the pubis, marked (t), and will be ſenſible of the great danger of uſing a broad-bladed gorget, or cutting with Le Cat's or Frere Coſme's knives.

Plate 7. Preſents the parts, with little variety, nearly in the ſame poſture; the urethra, and eſpecially the bulb of the urethra, drawn more aſide; and the moſt intereſting and critical ſtroke of the operation, viz. the cut in the urethra, repreſented. The tuber iſchii (a), the muſcle of the thigh, the biceps (b), the erector penis (c), the accelerator urinæ (d), the arch of the pubis (e), the pudic artery (f), are nearly the ſame as in the laſt drawing.—The view of the parts in the perinæum, and within the pelvis, differs in theſe reſpects. The accelerator urinæ (d) is more completely diſſected away from the bulb of the urethra. The bulb is drawn, by its faſcia and cellular ſubſtance, to one ſide, and pinned down at (g), ſo as to expoſe the membranous part of the urethra. The levator ani (h) is diſſected away from its origin in the pelvis, and ſo turned down as to uncover the proſtate gland (i), and the veſiculæ ſeminales (k k). The ſlit or opening made by the knife in the membranous part of the urethra is marked (l); it is by this ſlit that the beak of the gorget is admitted to the groove of the ſtaff. I have formerly argued the propriety, but this drawing proves the neceſſity, of cutting through the gland to reach the cavity of the bladder, and the difficulty of cutting into the bladder beyond it.

Plate 8. Is the laſt ſtage of this diſſection; it is a ſketch of the proſtate gland as opened by the puſh of the gorget, the laſt and moſt momentous ſtroke of the modern operation of cutting for the ſtone.

The bulb of the urethra (a) is ſtill more held aſide to expoſe the parts. The membranous part of the urethra (b) is ſeen as ſlit up by the knife; the ſide of

the gland, at (c), is ſeen opened by the inciſion of the urethra, being continued through the gland, by the edge of the gorget, which cuts laterally; the groove of the ſtaff which conducts the gorget, is marked (d); the lower bulgings of the gland are marked (e e); that part of the ſide of the gland which is left entire, is marked (f). That the ſide of the gland ſhould be left thus entire in a body which I had cut with a gorget much broader than I ſhould adventure to uſe, is very diſcouraging: Whether the wound made by the broadeſt gorget is really inadequate to the extraction of the ſtone, muſt be proved by more correct ſketches of diſſections made with the honeſt purpoſe of aſcertaining this important fact, yet even in this drawing, it plainly appears that one third of the ſubſtance of the gland remains undivided, and that the opening is hardly equal to the admiſſion of a large forceps.

The two Sketches or etched Drawings, No. 9. and No. 10 ſhow the Extent and Form of the Inciſion made in the Neck of the Bladder and Proſtate Gland, by a broad Gorget.

Plate 9. Is a drawing of the parts cut out from the pelvis. The parts are ſo laid upon the diſſecting board as to ſhow the inciſion of the proſtate from the outſide. The penis is much wrinkled; the bladder falls behind the rectum, and nothing is ſo diſtinctly ſeen as the inciſion of the proſtate, which makes the central part of the drawing; (a) marks the penis; (b) the ſkin, fat, and hair, of the pubis; (c) the ſcrotum and teſticles; (d) the crus penis, held up by a thread; (e) the body of the urethra above the perinæum; (f) the bulbous part of the urethra which lies in the perinæum, covered with its accelerator muſcle (g): The pendulous part of the bulb, which covers the membranous part of the urethra, is marked (h); the membranous part of the urethra, ſlit up by the knife, lies partly behind the bulb, but partly in view, at (i); the opening in the body of the gland, made by the lateral inciſion of the gorget, is marked (k); and this opening gapes with protruding lips from the thickneſs of the ſubſtance of the gland. That part of the body of the gland, which was left uncut by the gorget, is marked (l); the veſiculæ (m m) lie under the maſs of the gland, out of the way of harm, from the lateral cut of the gorget. The pudic artery (n), running curling along towards the crus penis, lies along the ſide of the gland, and too near it, not to be in danger from a broad-bladed gorget; the rectum, where it lies within the pelvis, and on which the veſiculæ, proſtate, and

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lower part of the bladder reſt, is marked (o o); the ſame inteſtine where it is above the peritonæum and within the cavity of the abdomen is marked (p); the levator ani (q) is turned down to uncover the veſiculæ ſeminales and proſtate.

The great internal iliac artery, which lies by the ſide of the rectum and diſpatches the ſciadic branches (r), to the back of the pelvis, and the pudic artery (n), to the parts of generation, is alſo ſeen in this drawing, and is marked (l), where the trunk divides into thoſe ſciadic and pudic branches.

Theſe are, I believe, the chief points in this view of the parts. The concluſions which, I think, we cannot avoid drawing from this view are theſe, that in operating with the gorget, you are, in addition to the accidents which are to be dreaded from ſo unguarded and violent a plunge, expoſed to two imminent dangers, —of a wound inadequate to the extraction of the ſtone, if your blade be narrow, and if broad, to a fatal hæmorhagy! Firſt, it is obvious that but two thirds of the gland are cut even by the broadeſt gorget: that the opening here repreſented will difficultly admit even the forceps: that whatever remains uncut of the gland, muſt be lacerated in extracting the ſtone: that every lithotomy performed with the gorget, while it is delayed till this reſiſtance is overcome by laceration, is accompanied with a contuſion of the parts. I cannot therefore but diſapprove of the opinion of thoſe who repeat this idle expreſſion of Le Cat's, (an expreſſion which was, in his mouth, but an apology for his very partial inciſion of the gland, his debridement du col de la veſſie,) that, even a ſmall part of the proſtate being ſlit up, the reſt will tear. We know by the opinions of the beſt ſurgeons, Deaſe and Camper, how ſlowly it tears, and with how much pain and danger.

Secondly, It may be aſked, ſince our common gorget makes an inadequate inciſion, may we not give ſufficient breadth to the cutting blade to divide the whole gland? No! the line of the pudic artery deſigned in this drawing, and marked (n), ſhows the danger of ſuch a project. We muſt, if we perſiſt in uſing the gorget, be contented with a narrow blade; for the arteries which are ſeen taken up, in the time of operating, are thoſe of the perinæum (as drawn in plate 5.). But if this, the pudic artery, be opened, the patient almoſt inevitably dies. Thus we are conſcious of the neceſſity, in uſing the gorget, of making either an imperfect inciſion or a dangerous one.

I have next to obſerve that the effects are nearly the ſame whether we run the common knife or the gorget backwards along the ſtaff; for the gorget is a knife. A priori, a dextrous ſurgeon would ſuppoſe it in his power, in running the knife.

backwards along the ſtaff, to give his inciſion what length he pleaſed, to run it through the whole ſubſtance of the gland, or to run it onwards, if he pleaſed, into the body of the bladder! but it is not ſo; and there are two cauſes to which it may be aſcribed,—firſt, the angle at which the knife lies with regard to the ſtaff and neck of the bladder, and, ſecondly, the receding of the gland. Even in opening a common fiſtula or a diſeaſed cyſt, you feel, in a particular manner, the receding of the edge which you mean to cut, and the unfavourable angle at which the knife lies to it. I am ſure I have not allowed myſelf to be deceived by the flaccid ſtate of the parts in the dead body; I am aware that it is ſuch, that no ſurgical operation can be properly repreſented in the dead body. But this is the fact, that in running your knife, or even the gorget, into the bladder, you almoſt miſs your ſtroke. The gland is actually ſo moveable, that, in making your inciſion into the urethra, the moving of the gland backwards and forwards upon the catheter would incline you to imagine you had made a long ſlit, when you have made but a puncture. When you drive a gorget againſt it, it moves backwards; and if the gorget were blunt, the gland would be puſhed away from the urethra; even when you uſe the ſharpeſt knife, the gland recedes, your ſtroke is difficult, and you could not believe, beforehand, how imperfectly you cut the gland. It is, when ſpeaking of the inciſion of the knife, in the hands even of the moſt dextrous ſurgeons, that Camper ſays, "Incredibile eſt quàm parva plaga ab omnibus etiam dexterrimis infligatur." The knife, run onwards into the bladder, makes no freer inciſion than the gorget, and it endangers the rectum, though it does not, like a broad gorget, endanger the pudic artery.

Plate 10. Is the counter part of this drawing it exhibits the ſame opening of the gland, from the inſide of the bladder, which, in plate 9., is ſeen from without; and proves ſtill more decidedly, how inadequate ſuch an inciſion is to the tranſmiſſion of the ſtone graſped in the forceps; (a) the penis, (b) the fat of the pubis, (c) the ſcrotum, and (d) the cut edge of the ſkin, cannot be miſunderſtood. The crus penis is, in this drawing, alſo ſuſpended by the cord (e); the bulb of the urethra (f) is almoſt covered by the cut edges (g) of the bladder. The whole bladder is now cut open and inverted. The general tumor of the proſtate lying under the bladder, is eaſily remarked at the three points (h, i, k); at (k) the bulging of the gland is ſeen more in profile, and, though the bladder is inverted over the maſs of the gland, the form and ſize of the gland appear diſtinctly through the thin and lubricous coats of the bladder. My reader can neither miſtake

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I. Bell delin.t

E. Mitchell sculp.t

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I Bell

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the form of the gland, nor the diſproportion betwixt the opening (l) and the general maſs of the gland; for, though it might be miſtaken for the natural oriſice of the bladder, it is actually the opening made by the inciſion of a broad gorget.

Plate 11. Diſplays the ſtate of the urethra, proſtate gland, and cervix, cut with the knife, completely, not by running the knife downwards, as Cheſſelden did in his firſt inciſions, but by diſſecting deep, ſlowly, and carefully, and then ſtriking the knife through the poſterior part of the gland into the groove of the catheter, and drawing it forwards from the back part of the gland to the membranous part of the urethra.

In this drawing are ſeen, (a) the body of the penis reclined back, and the ſtaff, being in the penis, and reclined back along with it; the point of the ſtaff is of courſe out of the bladder, and is ſeen at (b), projecting from behind the bulb at the point where the wound in the membranous part of the urethra begins: the crus penis is marked (c), the bulb of the urethra is marked (d), the anus ſurrounded by its cellular ſubſtance is marked (e), the external wound for the operation of lithotomy is marked (f), and the circumſtances of the internal wound, i. e. the inciſion of the urethra and proſtate, expreſſed in this ſketch, are as follows:

1ſt, A ligature is ſtruck into the upper part of the proſtate gland, by that it is pulled ſtrongly upwards, which ſtretches the cut urethra, and opens the lips of the divided gland. 2dly, The membranous part of the urethra, about an inch and a half in length, is ſlit up entirely, and lies now ſo expanded in conſequence of the diſſection of the parts neceſſary to ſhow the wound of the gland, that it is difficult to imagine how its edges could unite, or it could, in the actual operation, become a canal again. 3dly, The gland being fairly ſlit up by the knife, its upper part (g) continues circular, retaining the form of a gland, but the cut face of the gland is ſeen at (3), and this ſo diſplays the ſubſtance of the gland, that the mucous ducts (3, 3,) are ſeen running along in the heart of the gland, towards the ſide of the caput galinaginis, marked (4), where, as formerly deſcribed, the ducts of the gland open by ſix or ſeven very diſtinct mouths. The opening of the gland is here very ample, the whole body of the gland is cut through back to the body of the bladder; the back part of the gland and the body of the bladder being marked (h).

The looſe cellular ſubſtance, among which the proſtate gland and veſiculæ ſeminales lie, is marked by a deep ſhadow. The bladder, in a flaccid ſtate, is held up and turned ſomewhat to one ſide by the ligature (i): the left ſeminal veſicle and its duct, running up along the back of the bladder, is marked (k k); the right

veſicula ſeminalis, lying more under ſhadow, and hardly ſeen, is marked (l); the inteſtinum rectum is marked (m m), the probe (n) is paſſed through the wound of the integuments and muſcles.

Plate 12. Makes the demonſtration complete, it ſhows the bladder opened, and ſpread out over the rectum; even the convolutions of the veſiculæ ſeminales (a a) are marked through the thin and lubricous coats of the bladder, and the two puncta or openings (b b), where the ureters enter near the neck of the bladder, are ſeen. The external wound of the integuments (c) is here ſeen again, the wound of the gland (d) is alſo ſeen from the outſide, but the two cut faces of the gland are now neatly applied to each other. The membranous part of the urethra is alſo ſeen here, and need not be marked; but leſs of the wound is ſeen from without, that it may be more diſtinctly ſeen from within; and the wound within the bladder, marked (e e), is plainly ſufficient for the eaſy admiſſion of the forceps, or extraction of the ſtone; the wound of lithotomy I thus find, when made freely with the knife, goes entirely through the gland, beginning juſt above the mouth of the ureter, and terminating in the membranous part of the urethra.

I conclude the preſent leſſon in practical anatomy with this perſuaſion and hope, that, though thoſe who now operate will continue to uſe the gorget, thoſe who are educating for our profeſſion will ſtudy anatomy, and learn to operate with the knife. The demonſtrations I have given of this piece of anatomy are in every ſenſe important, and each ſtep of the demonſtration has brought us nearer to the ſolution of the important problem,—"Whether we ſhould operate with the knife or with the gorget?" The deciſion I leave with my reader: my ſole remaining duty is now reduced within a narrow compaſs; it is to lay down for him plain directions for performing whichever of theſe operations he may prefer.

OF THE MANNER OF OPERATING WITH THE SHARP GORGET.

Accuſtomed with teaching, I have had occaſion to obſerve that the mind of the ſurgeon is ill at eaſe, who has to perform an operation for which he has no theory; he muſt operate with little deciſion who merely imitates the motions of others. I have therefore been at pains to teach my reader, by plans and ſketches of the parts, to reflect on the conſequences of his inciſions, to mark the deſign of each ſtroke of the knife, to perform each movement, not by imitating the motions of

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others, but with intelligence and a fixed and determined purpofe; the being thoroughly acquainted with the projects and operations of others is, to the furgeon, the fureft means of underftanding that which he is actually to perform. Thus far do I naturally wifh to apologize to my reader for the tedious tafk I have appointed him, of confidering and ftudying maturely every operation before he prefumes to perform one; this is my fole reafon for undertaking, as I have done, the wearifome and difgufting tafk of deciding queftions long fince forgotten, and proving truths which will be fo eafily acknowledged.

I have alfo obferved that, to perform an operation like this with an intrepid fpirit and fteady hand, the mind of the young furgeon muft be compofed; he muft have an entire and perfect confidence in his own knowledge; he muft be familiar with the ftructure of the parts; he muft fee them expofed in every variety of pofture, and muft have their relations to each other explained: He muft diffect them often to make this knowledge familiar, and to acquire dexterity and addrefs, for no operation in furgery can be fo properly defined a *diffection* performed on the living body as this. While the young furgeon ftudies the connections and relations of thefe parts, he muft alfo be inftructed in all the accidents which may occur; he muft be taught to forefee every poffible difficulty, that he may not in the midft of an operation be overcome with the fudden apprehenfion of fome interruption which he does not underftand. The teacher who is to defcribe fo eventful an operation as this of lithotomy, muft firft explain in detail, circumftantially and feparately, each important movement of the hand or inftruments, and every precaution with which each is to be accomplifhed; and then clofe his leffon with fuch a rapid enumeration and defcription of the fucceffive acts, as will leave a vivid impreffion on the mind of the young furgeon of the manner in which he is to proceed. This laft defcription fhould ferve him as a dramatic picture of what he is to perform, which he may look upon anew every time he has to operate.

Before I proceed to defcribe the feveral ftages of the operation of lithotomy, there are fome preliminary points to be explained, which relate not to the drefs of the patient nor the height of the table, but to the main defign of the operation, and efpecially to the pofture of thofe very moveable parts, the rectum and bladder, with regard to each other, and the manner in which the furgeon fhould feel and afcertain every thing that is interefting to him. The kind and degree of diftrefs which your patient fuffers, will enable you to guefs at the ftate of the parts; in a boy who cannot have paffed many years in this condition, whofe parents, from obferving his pulling

out the penis and preſſing the thighs, and crying when paſſing the urine, can aſcertain both the duration of his complaints, and the degree in which his health is affected, you are ſure of every thing favourable for your operation; for boys are naturally healthy; the ſtone has not with them time to acquire any uncommon ſize, it uſually is ſmall like a gall-nut, and very rough and irregular on its ſurface; the bladder is not contracted nor ulcerated; you can feel the ſtone with the fingers, in the rectum, and preſs it forward ſo as to make it prominent in the perinæum; in a healthy boy with a ſmall ſtone recently formed, you undertake the operation with confidence, and probably would chooſe to cut upon the gripe.—In an adult who retains much urine, and paſſes it freely, who, though the ſymptoms of ſtone are deciſive, yet paſſes long intervals with little pain, in whoſe urine there is not great ſediment of mucus, and ſeldom any blood, with whom the paroxyſms of the diſeaſe, i. e. the temporary inflamed and irritated ſtate of the bladder, is not frequent; the bladder is probably capacious, the ſtone ſmall, and the ſtate of the parts moſt favourable for operating.—But the ſcene is ſadly reverſed when the patient, ſhrinking from the pains of the operation, has long endured the tortures of the ſtone: When he has endured this diſorder for many years, he is pale, languid, and emaciated; the parts are unfavourable to the operation, and his conſtitution to recovery: he can retain but one or two ounces of urine: the bladder is, by its frequent contractions, thickened in its coats, and, its inner and moſt delicate ſurface being in almoſt continual contact with the ſtone, he feels excruciating pains in the gland penis every time he paſſes his urine: when he walks, he has a gravitating and dragging feeling, accompanied with teneſmus or diarrhæa, from the increaſing ſize of the ſtone, by which his paroxyſms of particular diſtreſs are frequently renewed; his urine is ſo mixed with mucus, that, of the quantity which he paſſes into a glaſs for our inſpection, the urine being poured off, one half remains a pure white mucus, and each paroxyſm of pain, eſpecially if it ariſe from walking, is accompanied with a diſcharge of blood: the day he paſſes in almoſt unremitting torture, and, during the night, he is every half-hour on his knees, ſtraining to paſs his urine with dreadful pain. In ſuch a patient the bladder is ſmall, contracted, ſubject to inflammation; from frequent paroxyſms of the ſtone, the parts are in a ſtate ſometimes peculiarly diſpoſed to inflammation, and never favourable to the operation, while the ſtrength and conſtitution are exhauſted by ſuffering and want of reſt.

It is only when your patient is free from pain, when he has reſted, and is refreſhed, after the fatigues of the journey that has brought him to town, when he has

had a long interval after a paroxyſm of pain, when he is free from irritation and fever, and in no danger from the infection of any reigning epidemic, that you can venture to perform the operation. You do not wait, as formerly they did, for the more favourable ſeaſons of ſpring or autumn; theſe ſeaſons it was natural to prefer in France and Germany, where the winters are ſevere and the ſummers ſultry and oppreſſive: in this country you have no other cares than to nouriſh and ſtrengthen your patient, if exhauſted, and to prepare him ſo by opiates and the warm bath, as to enſure a favourable ſtate of the bowels and ſkin. The ſeaſon of any epidemic diſeaſe is much to be avoided. I have frequently, during the prevalence of influenza or of dyſenteric diſeaſes, been cruelly diſappointed in the adheſion of wounds after common operations, in caſes of the moſt ſimple inciſions, as in the extirpation of a cancerous breaſt; but the inflammation, which merely prevents adheſion and retards the cure in common operations, produces in this, where the wound is ſo near the viſcera, abdominal inflammation and death.

And let me adviſe the ſurgeon to be ſlow in pronouncing his opinion, to be careful to aſcertain the exiſtence of the ſtone, by ſounding, and to feel it alſo by introducing the fingers into the rectum, and to eſtabliſh and authenticate his own opinion by a regular conſultation, before he preſume to operate. He ſhould almoſt live with his patient for ſome days, for, unleſs he inquire carefully into his hiſtory, he cannot proceed with confidence, or his confidence may draw him into dreadful errors. The patient may have no ſtone, but an ulcerated and thickened bladder; he may have a ſtone, but too ſmall to require ſo dreadful an operation, one which the patient might be able to engage in the urethra, and paſs naturally by drinking floods of diluents, and paſſing the urine upon his knees; a ſmall ſtone, being impelled by the force of the urine into the urethra, ſometimes forms there a ſac for itſelf, and the ſound grating along this ſmall calculus, in paſſing along the urethra, perſuades the ſurgeon of the exiſtence of a ſtone in the bladder: a patient has been unfortunately cut for a ſtone ſo ſmall, that it has been ſwept out along the channel of the gorget with the flood of urine, and none been found to ſeize with the forceps; at other times a ſmall calculus, of a cherry-ſtone ſize, has been found in the hinge of the forceps, and ſuch accidents have been mentioned with as much indifference as if the ſurgeon were not reſponſible for the cruelty and folly of thruſting a gorget into the bladder of a patient whoſe ſtone was ſo ſmall as to be paſſed by the urethra. In ſhort, theſe are accidents which nothing but uncommon precaution and a moſt faithful attention to the complaints, feelings, and whole hiſtory of the patient, can detect or prevent.

However diſtinctly the ſound may plump upon the ſtone, and ſatisfy every one of its exiſtence, the ſurgeon never is to omit introducing one or two fingers into the rectum; from this mode of inquiry, various circumſtances may be diſcovered, and ineſtimable advantages ariſe to the ſurgeon, who, in place of imitating the motions of other operators, proceeds with intelligence and deſign. I hold this mode of examination to be little leſs important to the operator who cuts with the knife or gorget, than to him who cuts on the gripe: By introducing two fingers into the rectum he feels the ſtaff diſtinctly, upon which he is to perform the moſt delicate part of his inciſion: he feels the poſition of the rectum, which he is to keep out of the way of his inſtruments: he diſtinguiſhes, through the walls of the rectum, the membranous part of the urethra, which is to be his aim if he cut with the gorget, and the proſtate gland, which he is to divide, if he cuts with the knife: he feels the manner in which the ſtone lies in the bladder, which, after his inciſions, he is to graſp with the forceps: if the ſtone be ſmall, he may not feel it very diſtinctly; but if it be large, it falls low towards the neck of the bladder, is eaſily felt, its very form may almoſt be diſtinguiſhed, the ſtaff being plainly felt paſſing under the ſtone, when large, and holding it in its bend or curvature. The ſurgeon, by occaſional examinations, may almoſt eſtimate its ſize, and, if he do not expreſsly proportion his inciſion to its ſize, may at leaſt avoid the error of making a great inciſion for a ſmall ſtone, or the ſtill greater danger of making a ſmall inciſion when the ſtone is very large; and when the ſtone is ſo large as to require to be broken by ſtrong forceps, he may always be aware of the nature of the operation he is to perform. I remember to have been called to a conſultation, in which the gentleman, who invited the conſulting ſurgeons, wrote in theſe terms: "To conſult upon the caſe of a patient who has a ſtone in the urethra, and another in the bladder." The patient, in fact, had laboured long under the diſeaſe, the ſtone had increaſed to an enormous ſize: upon paſſing the ſound, it encountered the ſtone almoſt before it had entered the bladder, ſo low was the ſtone depreſſed by its own weight, and the patient's ſtraining dilating in ſome degree the neck of the bladder and projecting into it. Upon examining by the rectum, I felt a ſtone nearly the ſize of the fiſt, and intreated the ſurgeon to have ſtrong forceps in readineſs to break it in caſe of difficulty. When we were met for operation, I uſed the freedom of aſking, "Whether forceps were at hand to break the ſtone?" He ſaid, "No; that he had ſent for forceps ſuch as I wiſhed, but could not eaſily procure them." Then I ſaid, "Sir, if you value your own reputation, or your patient's life, refrain from operating till you are better provided, which you may eaſily be

to-morrow morning; to perform this operation in the ordinary way, will be murder." He turned about and proceeded with his operation: the ſcene which enſued was dreadful; two or three forceps were ſucceſſively twiſted, or broken; all preſent were in the moſt diſtreſſing perplexity. Mr. Wood bethought himſelf of a pair of large and ſtrong forceps, which had lain as lumber among his apparatus; theſe were ſent for to his houſe, and with them the ſtone was extracted; but the operator had never one moment refrained from labouring with one inſtrument or another; the patient had ſtruggled under his hands a full hour, in the moſt dreadful agonies; I need hardly ſay, that in two days he died *.

Not to break the ſtone, when of ſo uncommon a ſize, is cruel and dangerous, and no one accuſtomed with this operation will ſcruple to do ſo for fear of fragments of the ſtone remaining in the bladder, for he muſt be conſcious that he ſeldom operates without the forceps chipping off ſmall fragments of the ſtone, which are more dangerous than the fragments of a ſtone deſignedly broken, as they are leſs obſerved.

The condition of the rectum and bladder ſhould be an object of particular attention. The bowels muſt be emptied by a purge two days before operating, for fullneſs and irritation of the bowels will diſpoſe to abdominal inflammation. The rectum muſt be emptied by a glyſter on the morning of the operation, leſt the fulneſs of the gut ſhould expoſe it to be wounded: This if not a fatal is yet a blundering wound, of which the ſurgeon ſhould be much aſhamed: although, we have the beſt authority for affirming that the inteſtine may be wounded by the moſt dextrous operator; Cheſſelden acknowledged to Mr. Morand, that he had twice, in operating, wounded the rectum. As it is chiefly important to prevent the cutting edge of the gorget injuring the back part of the bladder, it is of the firſt importance, in operating with the gorget, to have the bladder full; the fullneſs of the bladder allows the ſtaff to be turned eaſily to every ſide of the bladder, in feeling for the ſtone; it allows the ſurgeon to ſet the ſtaff before cutting, in the preciſe direction that he wiſhes to have it. The fullneſs of the bladder preſents the fore part of its body viz. that where the proſtate ſurrounds it, fairly to the cutting edge of the gorget, and gives the bladder a ſteadineſs to reſiſt the puſh. This fullneſs of the bladder prevents the cutting gorget being driven through the fundus among the bowels, and the quantity of urine running off freely along the channel or hollow of the

* I have preſerved this ſtone.

gorget indicates to the operator, that this, the moſt dangerous movement in the operation, is properly performed. The patient for this end muſt retain his urine during four or five hours in the morning of operation; in boys, and even in men, a linen rag muſt be tied round the penis to prevent the urine flowing off. The ſtring muſt not be undone upon introducing the ſtaff for operation, for the body of the penis is ſo compreſſible, that the ſtaff paſſes as eaſily when the ſtring is left, as when it is taken away. I have often been provoked to ſee the ſtring taken off, the ſtaff introduced, and the whole of the urine allowed to run off by the groove of the ſtaff, in the very moment in which the ſurgeon is about to drive his gorget into the bladder!

Foubert, in performing his operation, depended more entirely upon the diſtenſion of the bladder, than thoſe who operate with the gorget, for, without its being full, he was in danger of miſſing the ſtroke with his trocar; once, in operating, he found that not one drop of urine flowed upon ſtriking in the trocar; he believed that he had actually miſſed the bladder, but he found, upon inquiry, that the man, being impatient of retaining his urine, ſlipped behind the ſkreen while Foubert (for it was in the hoſpital) was operating upon another patient, undid the ſtring with which the penis was tied, and piſſed luſtily, and then deliberately tied the ſtring about his penis, came forward and preſented himſelf for operation: Had Foubert been aware of what had paſſed, he muſt have delayed the operation till the following day.

As one great purpoſe of many things which the ſurgeon does immediately previous to the operation, is to aſcertain the relative poſture of the parts, and revive his own recollections of the ſeveral points, he ſhould never fail to introduce the ſtaff himſelf, though often this is committed to the aſſiſtant. May not an unſkilful aſſiſtant drive the point of the ſtaff through the membranous part of the urethra, and lodge it between the rectum and bladder, where, of courſe, the gorget when driven along will follow the groove? Is it not a ſatisfaction to the ſurgeon to paſs the ſtaff himſelf, that he may do it gently without irritating the parts; that he may feel and diſtinguiſh any rub from any ſmall calculus, ſticking in the urethra; that he may lodge fairly in the bladder that grooved directory, which is to guide the moſt important ſtroke of his knife; that he may plump his ſtaff againſt the ſtone, and feel it diſtinctly before he operate; that he may, after introducing the ſtaff, paſs his finger into the rectum, feel how the ſtaff lies, incline the handle of it to the right groin, and ſo protrude the heel in the perinæum where he is to cut?

Will not the introducing and ſetting the ſtaff and feeling its curvature, both in the perinæum and from within, give the operator more deciſion, and a more diſtinct recollection of what he has next to perform? To deliver the ſtaff to the aſſiſtant, that he may introduce it, is a ſlovenly, a timid, or an evaſive practice; I have ſeen this often done, but it always ſeemed to me that the man who dared to undertake the operation of lithotomy, was doubtful whether he could introduce a ſtaff; or that he was ſo jealous of his reputation as a rapid operator, that he would not allow the more ignorant of the attendants to calculate the operation as begun, when he was only introducing the ſtaff; or perhaps he feared leſt his hand ſhould be unſteadied by ſome ſlight oppoſition to the introduction of the ſtaff! a part of the operation which ſhould, in fact, by reminding him of all the important relations of the parts, inſpire him with ſteadineſs and manly reſolution.

There is a gradation in the length and curvature of the inſtruments which are on various occaſions to be introduced into the bladder. The CATHETER, as it needs not enter far into the neck of the bladder, though it ſhould always be as big as the urethra will eaſily admit, ſhould not be long, and ſhould have a very gentle and ſimple curve: The SOUND, with which we feel for the ſtone, muſt be round, ſmooth, longer, and more curved; but it muſt not be very long nor much curved, leſt it do not turn eaſily from ſide to ſide in the bladder; and it ſhould be introduced when the bladder is moderately full, that it may be turned eaſily in various directions in ſearch of the ſtone, which, if it be not found when the bladder is full, or the patient ſeated, or lying on the ground, may perhaps be felt after he has been permitted to empty the bladder, or allowed to ſtand up: The STAFF, or grooved ſound, with which the ſurgeon means to operate, by cutting upon it with the knife after the manner of Raw or Cheſſelden, muſt be big, muſt have an acute angle at the place where it turns at the entrance of the bladder, and muſt be protracted beyond this angle into a long and ſtraight beak, that it may be diſtinctly felt in the bladder; and its groove muſt be large and round-lipped, that it may be eaſily diſtinguiſhed, and may guide the inciſion-knife or lithotome fairly: But the ſtaff along which the ſurgeon deſigns to run the ſharp gorget,—though it ſhould have the ſame ſudden angle or prominent heel, that it may be eaſily felt through the membranous part of the urethra,—though it ſhould have the ſame wide groove, but with lips leſs obtuſe or round,—ſhould not be protracted into ſo long a beak, leſt it ſhould hold the knob of the gorget too long engaged in the groove, and carry it ſo deep as to endanger the fundus of the bladder.

The poſture in which the patient is bound, is horrible, moſt oppreſſive, but yet it is eſſential to the performing of an operation, where the ſlipping of one inſtrument, or the miſgiving of one ſtroke of the knife, makes the difference—of ſafety or death. He muſt be made to graſp his feet with his hands, and ſecured in that poſture by ſtrong garters, encircling the wriſts and ancles, and thus, bended into a curve, he reſts almoſt upon one point of the ſpine, and is brought ſo near to the edge of the table, that he is almoſt ſuſpended in air, by the two lateral aſſiſtants who ſupport each a foot and arm. Unleſs the patient is brought thus far over the edge of the table, ſupported by the aſſiſtants, and his breech bolſtered up by a pillow; unleſs his breech project over the edge of the table; unleſs the perinæum be turned almoſt directly upwards, and the ſurgeon ſeated low and rather under his patient, he cannot purſue his inciſion ſo far beyond the tuber iſchii as he ſhould do in order to cut the tranſverſe muſcle, for the inciſion ſhould paſs the curvature of the hip, as will be ſeen in the firſt drawing on the ſheet of plans appropriated to the operation with the gorget.

The patient ſhould be brought out for operation, dreſſed in a looſe gown, ſtockings, and ſlippers: his neck-cloth ſhould be looſened, or a light ſilk handkerchief put about in place of it: three medical aſſiſtants ſhould ſupport him, one on each ſide ſhould hold, each, a leg and wriſt, ſupporting the ſole of the foot in the hollow of one hand; the third aſſiſtant ſhould ſupport his head and ſhoulders, and keep him forward according to the operator's directions. The table ſhould be big, firm, and ſteady, covered with a folded blanket, with one or two ſmall pillows placed for the head to reſt upon, and one longer and bigger to ſupport the breech, or rather the loins; a little ſand ſhould be ſtrewed under the lower end of the table. A friend ſhould ſtand by to ſpeak to him, to encourage and ſupport him, and to give him occaſionally a little wine and water; and, as no unſeemly confuſion ſhould be allowed, every thing on the table of inſtruments ſhould be fairly arranged, and every attendant ſteady, ſilent, and obſerving. One only ſhould hand the inſtruments; while the aſſiſtant ſurgeon, taking his place behind the young man who ſupports the right foot, waits there till the ſurgeon, having introduced the ſtaff, and felt and placed it, lays it down towards the right groin, and gives it to him in charge; when he is to graſp it firm and hold it ſteady with his right hand, but without preſſing hard, ſupporting the teſticles and ſcrotum with the flat palm of his left hand, and pulling ſlightly upon them ſo as to ſtretch the perinæum and make it tenſe for the inciſion.

Upon the table are placed, a decanter of wine, another of cold water, and a large glafs of cool wine and water, which may be poured into a fmall tea-pot, as more convenient for the patient in the awkward pofture in which he lies; a bafin of warm water, with the forceps and fcoops in it; and in this bafin of water the furgeon heats the ftaff with which he choofes to operate. The ftaff he choofes, and the gorget fuited to the fize of the patient, and well and fmoothly fitted to the groove of the ftaff, and the knife with which he is to cut, are laid on a plate upon a fine cloth or towel. Thefe inftruments lie on the plate; the ftaffs and forceps and fcoops are placed in the bafin of hot water; the fponge, for wiping the wound, in another bafin of warm water: The needles, the lint, the dry fponges, or agaric, to be ufed in cafes of unufual hæmorrhagy, together with the canula, round which the fponge or lint is to be wrapped in cafe it fhould be neceffary to thruft a canula into the wound, lie behind the bafins and apart; and along with thefe is to be laid, in another bafin of warm water, a ftrong fyringe, or a large glyfter bag and pipe, for wafhing out any fmall calculi or fragments of a broken ftone.—When the furgeon, advancing to the table, thus arranged, warms the gorget, and then ticks it in his girdle or apron ftring; warms the ftaff and oils it, with the purpofe of introducing it; twifts a towel into his girdle, for it is impoffible to perform the feveral parts of an operation neatly, with foiled hands; and leaves upon the plate only the incifion-knife, which his affiftant hands him, upon receiving the fign; and fometimes alfo the gorget is left to be handed by the affiftant.

The operation of lithotomy, as performed with the gorget, may be divided into thefe ftages: 1ft, The external incifion, by which we divide the fkin and the tranfverfe mufcle of the perinæum: 2dly, The internal diffection, by which we divide the fat and cellular fubftance, and the fibres of the levator ani mufcle, and open the urethra: 3dly, The fettling of the gorget in the groove of the ftaff, and pufhing it onwards through the proftate gland: 4thly, The introducing the forceps withdrawing the gorget, and grafping and extracting the ftone.

OF THE EXTERNAL INCISION.

The general belief and the common defcription ftands thus: "That you are to make your ftaff protrude in the perinæum, and to perform your external incifion, by cutting upon the ftaff."

Nothing is more untrue; we cut far from the ſtaff: and this unfortunate deſcription occaſions infinite perplexity to the young ſurgeon, who, in ſetting his ſtaff, cannot make it be felt in that place where he muſt perform his inciſion, and who, having made his inciſion, and penetrated to a conſiderable depth without feeling the ſtaff, continues in confuſion and diſmay.

In the ſheet of drawings which are to illuſtrate the operation with the gorget, there are ſeveral plans which will ſerve to correct this miſtake. The external inciſion relates not at all to the neck of the bladder, nor is it made upon the curve of the ſtaff. The ſtaff can by no force be made to project in the perinæum lower than the point (a), figures firſt and ſecond. The external inciſion relates not to the curve of the ſtaff, but to the great hollow betwixt the rectum and tuber iſchii; it is deſigned merely to open the way into this hollow, through which the ſtone is to be extracted; and the ſurgeon's chief care muſt be, after cutting through the ſkin and fat, to divide the tranſverſalis perinæi muſcle, and all the ligamentous fibres, which would, if left undivided, oppoſe the extraction of the ſtone. The inciſion begins at that point, an inch below the ſcrotum, where the heel of the ſtaff is felt, and, departing from that point and leaving the direction of the ſtaff, it paſſes over the great hollow in a line betwixt the anus and tuber iſchii; the inciſion is performed in the following manner:—The ſurgeon ſeats himſelf on a low ſtool; the aſſiſtant draws the teſticles upwards, to make the perinæum tenſe, and gives a ſlight preſſure to the ſtaff; the operator then lays his left hand flat over the right buttock of the patient, ſo that the palm of the hand lies upon the tuber iſchii; ſpreads out his fingers upon the perinæum, as in the poſture of diſplaying a ring; by preſſing firſt two or three times with the point of the fore-finger at the root of the ſcrotum, he feels the heel of the ſtaff; and then, by drawing the ſkin of the perinæum towards the left ſide with the points of the fingers, he makes the lurk betwixt the perinæum and the hip, even. Then, taking the knife (which ſometimes, while ſtretching the perinæum, the ſurgeon holds in his mouth) in his right hand, he holds it lightly like a writing-pen, with the points of the thumb and three fingers; begins the inciſion about an inch (in a big man) behind the ſcrotum, and carries it downwards, declining regularly towards the hip, till it terminates apparently upon the hip, for though the inciſion is carried regularly in the middle betwixt the anus and tuber iſchii, yet, the ſkin being tenſer to the ſide of the tuber iſchii, the wound ſeems to decline towards that ſide. The extent of the wound being aſcertained and marked out by this firſt ſtroke of the knife, three inches and a half in length, more

or leſs, according to the bulk of the patient, or the ſize of the ſtone; this inciſion beginning behind the ſcrotum, proceeding obliquely towards the hip, running in the middle betwixt the anus and tuber iſchii, or holding off but a little from the anus for fear of wounding the rectum, will be found to have its centre nearly oppoſite to the anus; and if the whole length of the inciſion be three inches and a half, two inches of its length will lie before the anus, and one inch and a half behind. The fingers of the left hand, which at firſt kept the ſkin tenſe, are now withdrawn for a better uſe. The fore-finger now guides the knife, and the operator proceeds to diſſect through fat and cellular ſubſtance, and muſcular and ligamentous fibres, till the wound is free and open, till all ſenſe of ſtricture is gone; for it is only by feeling oppoſition and ſtricture that we recognize the tranſverſe muſcle: When this hollow is fairly laid open, the external inciſion, *which relates merely to the free extraction of the ſtone, is completed*; and the operator begins to feel for the ſtaff.

OF CUTTING THE URETHRA.

The inciſion thus made is into the hollow of the pelvis below the place of the ſtaff, which is only to be felt (at (a) figures firſt and ſecond) in the upper angle of the wound. If it were his deſign to operate only with the knife, the ſurgeon would now puſh his fingers deep into the wound, and, by the help of the fore-finger, diſſect from the urethra along the body of the gland, till he diſtinguiſhed its thickneſs and ſolidity, and reached the back part of the gland; then plunging his knife through the back of the gland, and ſettling it in the groove of the ſtaff, he would draw it firmly and ſteadily towards him, preſſing the knife ſteadily into the groove of the ſtaff, and then, the free diſcharge of the urine aſſuring him that the gland and cervix veſicæ were divided, he would lay aſide his knife, paſs the left fore-finger into the bladder, withdraw the ſtaff, and introduce the forceps.

But in operating with the gorget, the next buſineſs after the outward inciſion is to ſeek out, not the body of the proſtate gland, but the membranous part of the urethra; to find it, the operator turns his fore-finger towards the upper angle of the wound; feels for the ſtaff cloſe under the pubis, when it lies cloſe upon the bone, hardly to be diſtinguiſhed from it; and as the operator recognizes the tranſverſalis muſcle only by the feeling of reſiſtance, he recognizes the membranous part of the urethra only

by the nakednefs of the ftaff. But it is fafeft to be very clear, to diffect fairly to the ftaff, to feel not merely the membranous part of the urethra, but the body of the gland. In this ftage of the diffection you can do no harm; a fair diffection may fave you the difgrace and danger of making three or four unfuccefsful cuts at the urethra; you therefore keep preffing down the rectum, with the mid-finger a little crooked; with the fore-finger pointed nearly upwards, you guide the knife in diffecting along the naked part of the ftaff, and the body of the gland; and when all is fair, and you are prepared to ftrike into the urethra, you place your fore-finger upon the apex or point of the proftate gland; and, turning the edge of your fcalpel upwards, you ftrike it firmly through the urethra into the groove of the ftaff, and draw it towards you, fteadily, along the groove, till you have made an opening fuch as you cannot mifs, about half an inch in length, into which you fix the nail of your left fore-finger, or of your thumb, and prepare to introduce the gorget *.

OF INTRODUCING THE GORGET.

Keeping his thumb-nail firmly fixed in the groove, the furgeon gives away the knife, and lifts the gorget; poifes it, and then holds it firmly in his hand. He then paffes the gorget into the wound, where it enters pretty deep before it reaches the ftaff; then, pointing the beak of the gorget to the groove of the ftaff, he lodges it fairly in the groove, and running it once or twice backwards and forwards to be fure that all is fair, and holding the gorget fteady with the right hand, and reaching the left hand over the pubis to receive the ftaff from his affiftant, he lays hold of the handle of the ftaff, holds it fteady for a moment, then, moving the gorget with the right hand, feels by the left whether the beak runs fairly and fmoothly in the groove; then, the two hands acting in concert with each other, the operator balances the ftaff and gorget, and, by making the two hands feel each other, prepares them for co-operating in the moft critical moment of driving in the gorget; and

* I intreat thofe who are not perfectly confident to make their incifion of the urethra more than half an inch in length; an incifion of half an inch in length is juft fufficient to be diftinctly felt and to allow the beak of the gorget to be fairly introduced; but it is an incifion which a furgeon unaccuftomed with operation might lofe, and fall into confufion. I advife him rather to flit up nearly the whole length of the membranous part of the urethra, when his incifion will be nearly an inch in length.

when all is prepared for driving home the gorget into the bladder, the ſurgeon depreſſes the handle of the ſtaff, ſo as to carry the point of it deep into the cavity of the bladder; his ſtaff ſtands, at this moment, at right angles with the patient's body; he riſes from his ſeat, ſtands over the patient, for an inſtant of time, balancing the ſtaff and gorget once more, and, feeling once more that the beak is fairly in the groove, he runs it home into the bladder, pointing it rather upwards, than directly backwards: Then the urine guſhes out; the beak of the gorget goes off from the point of the ſtaff with an audible cluck, and the operator withdraws the ſtaff with the left hand, as the concluſion of that movement with which he drives in the gorget with the right.

OF EXTRACTING THE STONE.

The moment the gorget is driven home, as it always is, up to the hilt, (the thumb of the operator, which lies upon the gorge of the inſtrument, being actually within the wound,) the fundus of the bladder is in danger,—for the horrid and unnatural feeling of being thus impaled excites the patient to preſs downwards, as in paſſing the fæces and urine; the bowels are forced down upon the bladder; the fundus of the bladder is forced, by this preſſure from above, and its own natural contractions, upon the edge of the inſtrument; matters ſtand now in the very dangerous condition repreſented in figures 3. and 4., and the beſt means of preventing harm, is to introduce the forceps quickly! no time ſhould be loſt in the fooliſh ceremony of introducing the fore-finger to feel for the ſtone! Thoſe who uſe only the knife, uſe the finger as a conductor for the forceps; but thoſe who uſe the gorget as a conductor for the forceps, cannot feel the ſtone with the finger, for it lies under the gorget, and the gorget exceeds the length of two fingers.

The moment the gorget is thruſt home, the operator withdraws the ſtaff, and gives it away; takes the handle of the gorget with the left hand, and the forceps in the right; the chops of the forceps being cloſe, he paſſes them along the channel of the gorget, and the moment the right hand has introduced the forceps, the left hand withdraws the gorget. Then the operator, taking the handles of the forceps, one in each hand, begins to feel for the ſtone; the forceps muſt, by paſſing along the gorget, inevitably paſs over the ſtone; let him, therefore, taking the two handles

of the forceps, one in each hand, ſtand high above his patient, point his forceps downwards towards the bottom of the pelvis, to that ſac or bulging of the bladder, in which the ſtone uſually lies, and there he, in nine of ten caſes, will encounter the ſtone; if he feels it with the forceps, and cannot ſeize it, it is becauſe he has paſſed over it, and touches it only with the lower ſide of one of the chops. When he feels that he preſſes the ſtone with the point of the forceps, he then opens the blades with both hands, graſps the ſtone, tries the hold he has of it in a way which it is impoſſible to deſcribe, then, by graſping very firm with the right hand, at the extremity of the handles, he holds the ſtone firm, and, by laying the left hand on the forceps, and holding with it alſo, he aſſiſts the right, confirms the hold, and prevents at the ſame time (by ſlipping his left fore-finger into the hinge) any undue preſſure ſuch as a ſoft ſtone will not eaſily bear. Having thus fixed his hands, he begins to pull; and if the ſtone be ſmall and the inciſion free, it comes eaſily and ſmoothly along. But I have obſerved that the young ſurgeon, when he feels the ſlighteſt oppoſition, expects to ſucceed by turning, twiſting, and every kind of unmeaning violence, and has no abſolute rule for a ſtage of the operation, which ſhould yet be performed with an intention and manner as determined as any other. If the ſurgeon holds firm and pulls in one uniform direction, though he had the ſtrength of a Cyclops, he could not ſucceed; if he turns and twiſts his forceps from ſide to ſide, "this way and that way, çà-et-là," as if he were dilating, not extracting, according to the directions of Paræus, ſince he is pulling without any deſign, he ſtill has but little chance to ſucceed. If he will but reflect on the operation of the forceps, that the forceps are two levers with which he is to act alternately, depreſſing firſt one ſide of the ſtone, then the other, he will not ſcruple to adopt that deciſive manner in extracting, which, though it ſeems harſh, is really eaſy, and relieves his patient the moſt ſpeedily, and with the leaſt violence. Let him, after having ſeized the ſtone fairly, preſs the handles of his forceps firſt down, then raiſe them up, then depreſs them again, with a wide and free motion, and he will be ſenſible, that by this ſlow and equable motion, the parts are little bruiſed by the cheeks of the forceps, and the ſtone will be, in a few ſtrokes, brought to the mouth of the wound, and turned out, by one wide but gentle movement, into the left hand of the ſurgeon, which is held with the palm upwards ready to receive it.

Fig 1.st

a

Lithotomy with the Gorget

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Manner in which the Gorget is run in upon the Staff

Fig 2.d

a

✢ The point of the Catheter supporting the fundus of the Bladder — which shows the danger of running in the Gorget.

OF THE CAUSES OF THE SLIPPING OF THE GORGET.

It will be eafily perceived that the critical movement on which the fate of the patient depends, is, the cutting the urethra, the lodging the beak of the gorget in the groove of the ftaff, and the driving home the gorget. In attending operations, I have obferved, in this moment, fuch a degree of hefitation and evident alarm on the part of the operator, as convinces me that it is a moft important duty to explain the various caufes of the gorget flipping off from the groove of the ftaff: he will beft guard this accident, who is aware of every poffible caufe: it proceeds, like every important error, from want of knowledge in anatomy: Since we often fee the furgeon feeking the femoral artery for an hour, to tie it in a found thigh, (the aneurifm being in the ham,) we need not wonder if fuch an executioner mangle the urethra in attempting to perform lithotomy, and conclude with thrufting his gorget betwixt the bladder and rectum.

1ft, It fometimes happens, that the furgeon, deceived by the common defcription, and expecting to cut his incifions fairly upon the bend of the ftaff, goes deep into the hollow of the pelvis, and yet, after much diffection, feels no ftaff;—falling then into confufion, and anxious to be relieved from this diftreffing fcene, he begins to believe that he muft *fomehow* have cut the urethra, and, believing this, he at a venture thrufts in his gorget: Sometimes the furgeon, having felt the ftaff, and diftinguifhed the membranous part of the urethra, and turned up the knife, cuts into the groove with fo tremulous a hand that he hardly wounds it; and having failed to diffect the urethra naked, before making this incifion, the fibres of the levator-ani mufcle clofe upon the fmall flit which he had made in it, and thus, after feeling diftinctly the groove of the ftaff, he lofes it again, and his gorget paffes betwixt the bladder and rectum.

2dly, Confufion and alarm, in the fimple bufinefs of cutting the urethra, is a fure indication that the furgeon is in danger of doing fomething very terrible. Often you will obferve the furgeon, in place of turning up his knife at once, and ftriking it fteadily and firmly into the groove of the ftaff, lay down the knife, and lift it alternately feveral times; firft he believes that he has cut the urethra, and then again becomes fenfible, either that he has not cut it, or that he has loft the fmall flit that he had made. I have feen the operator give away the knife, receive the gorget

from the affiſtant, point it at the groove of the ſtaff, and try to introduce it, reſume the knife, and make new inciſions in the urethra, five or ſix ſucceſſive times. I have ſeen the gorget driven twice, not into the bladder, but deep among the bowels, for although there was a ſtone, the ſurgeon never reached the bladder, never one drop of urine flowed, the ſtone was not extracted, and the boy died; this laſt miſtake is mere butchery; the firſt is little ſhort of it, for if every time that the ſurgeon reſumes the knife, he has loſt his firſt inciſion and makes a new opening in the urethra, if every time that he loſes one inciſion, the urethra has turned in ſome ſlight degree upon the ſtaff, before he makes another, the ſucceſſive inciſions will almoſt entirely ſeparate the urethra from the bladder, and the ſlighteſt puſh of the gorget will drive off the gland from the urethra.

3dly, There is much too in the direction in which the gorget is driven forward, for though the urethra be fairly cut, yet the angle at which the ſtaff is held, or manner in which the beak of the gorget is laid to the groove of the ſtaff, may diſappoint the ſurgeon of his purpoſe, and make the gorget ſhoot paſt the bladder or puſh off the gland from the urethra. If the handle of the ſtaff be too much depreſſed, ſo as to turn its point high up towards the fundus of the bladder, while the gorget is pointed too low towards the rectum, the gorget, in place of entering ſmoothly, will ſtart off from the ſtaff: or if, on the other hand, the handle of the ſtaff be held too high, is too near the groin, too much in its firſt poſition, and the gorget pointed much upwards, the directions of the groove and the beak of the gorget will not correſpond; the cutting edge of the gorget will not be ſo directed as to cut its way forward; the beak will hitch againſt the point of the gland, and may, eſpecially if the urethra be mangled, force off the neck of the bladder and proſtate from the urethra.

4thly, The ſurgeon, in place of moving the gorget along the groove of the ſtaff, ſometimes allows both gorget and ſtaff to go together deeper into the bladder, till they touch its fundus; ſometimes the operator, by an awkwardneſs in the poſture of the gorget, needs to uſe ſuch force, that the gorget, when it ſtarts through the firſt obſtruction at the neck of the bladder, may (eſpecially in a contracted bladder) wound the fundus, the parts and inſtruments ſtanding in the poſture repreſented in figure 4. Even the forceps, blunt as they are, may, by rudeneſs and ignorance, be driven through the fundus of the bladder, the ſtone eſcaping by the rent, where the forceps cannot follow! it into the cavity of the abdomen. Thoſe who prefer the gorget, and regard it as the ultimate improvement of this operation, avow theſe facts.

"I have more than once (ſays Earle) known a gorget, though paſſed in a right direction, puſhed on ſo far and with ſuch violence, as to go through the oppoſite ſide of the bladder."

5thly, If the ſtaff be ſhort and the aſſiſtant unſkilful in the management of it, he may, after the ſurgeon has cut the urethra, allow the ſtaff to recede from the bladder, and, in thruſting it back, puſh its point not home again into the bladder, but out through the wound in the urethra! The ſtaff being thus lodged betwixt the rectum and bladder, the gorget muſt follow it; the ſurgeon feels the groove of his ſtaff quite naked, fixes the beak of his gorget, and drives it home in the true direction, but no urine flows! upon introducing the forceps, he feels no ſtone! he is in the end, after much violence, obliged to put his patient to bed to die. Such an accident is recorded by Mr. Earle, it proves the dangers of this particular operation with the gorget, and the ſuperiority of that with the knife; the plunge of the gorget, to thoſe who know to operate only with the gorget, is irremediable, but a ſurgeon perfectly acquainted with the parts, and ſkilled in diſſection, would, in ſuch a caſe, introduce his finger, feel for the proſtate, ſtrike his knife into it, and, putting in his finger, guide the forceps into the bladder, and at leaſt extract the ſtone if not ſave the patient. Cheſſelden once performed this, when another operator had failed, and puſhed his inſtruments betwixt the bladder and rectum.

6thly, Though the gorget has paſſed right, the forceps may be directed wrong, for after a firſt attempt at extraction, and when the forceps have ſlipped, the ſcoop or finger are introduced, and the forceps re-entered; but, the opening which the gorget makes, does not very eaſily admit the forceps, even when the gorget lies in the wound, to guide them; after the gorget is withdrawn, the forceps enter with greater difficulty, they ſlip more eaſily in among the looſe cellular ſubſtance of the rectum. The operator opens the forceps, and feels in vain for the ſtone; he at laſt has an indiſtinct perception of the ſtone, cloſes them upon it, graſps it, and begins to pull; but the forceps ſlip; the bladder is betwixt the ſtone and the forceps. Theſe are the true ſacculated ſtones, but the ſac is the bladder, and the cavity is that which is made among the cellular ſubſtance of the rectum, by the turning of the forceps in ſearch of the ſtone, and the opening their blades violently to graſp it. In one unfortunate caſe, the ſurgeon, groping thus upon the outſide of the bladder, actually graſped with the point of his forceps, and twiſted away, the great part of the proſtate gland, which, when he had thrown it down

among his feet, was picked up by a profeſſor of anatomy who aſſiſted at the operation, and, when the gentleman died, the parts were diſſected out, and are preſerved.

It is unqueſtionable that the gorget is often thus plunged among the viſcera, and perhaps it is to be lamented that ever cutting for the ſtone ceaſed to be a diſtinct profeſſion, or that the operation was brought to that kind of perfection, which induced ignorant men to venture upon an operation which, even thus ſimplified, requires conſummate ſkill and knowledge. Whatever may be the aparent facility of this common operation with the gorget, that with the knife is alone ſecure, it is indeed to the laſt degree ſimple, as ſimple as that of cutting on the gripe; for it is cutting with the knife upon the ſtaff, which is more eaſily held, fixed and directed, than the ſtone. But ſince the operation with the gorget has been approved, and will continue to be performed, I have taught it faithfully; nothing can, in my opinion, ſo well prepare the young ſurgeons againſt this fatal accident, the ſlipping of the gorget, as knowing perfectly the cauſes from which it may ariſe. And I will now fulfil my purpoſe of deſcribing the ſeveral acts and ſtages of the operation in that rapid ſucceſſion in which they ſhould be performed.

THE OPERATION OF LITHOTOMY.

An operation ſo mechanical as this, regulated in its moſt critical movement by a grooved ſtaff, ſhould, though there muſt be no unbecoming haſte, proceed rapidly without a pauſe, the ſeveral acts being connected in idea, and continuous in execution. The ſurgeon ſhould never, to catch the vain applauſe of the ill-judging ſpectators, proceed in haſte and trepidation; but he who can perform the operation at all, will perform it beſt to his feeling, and, for the ſafety of the patient, rapidly; for, having the purpoſe of the operation full in his mind, its ſeveral ſtages are as parts of one continued action, on which his mind is ſo intent, his judgment ſo clear and unperplexed, his hand ſo ſteady and reſolved, that he moves, by a ſort of inſtinct, without pauſe as without fear. In truth, dextrous and rapid execution are ſynonymous words; it is not policy, but feeling and ſelf-confidence, that carries the ſurgeon boldly on; this rapid energetic manner is natural and not aſſumed; it is even in ſome degree eſſential to the patient's ſafety, that the ſeveral acts

ſhould ſucceed each other without ſtop or pauſe,—that, the gorget ſhould be introduced as ſoon as the urethra is cut,—and, the forceps inſtantly after the thruſting-in of the gorget.

The ſurgeon ſhould be prepared for this, and, in place of receiving and returning every inſtrument from his aſſiſtants, ſhould draw each inſtrument from his girdle when he is to uſe it. Every thing being prepared, he ties an apron about him, which being firmly girt, he twiſts a towel through the apron-ſtring, fixes the gorget alſo in the ſtring like a dagger in the girdle, and the forceps he puts in the fore-pocket of his apron. Then advancing to the patient, who is tied and placed for operation, though his poſture is not yet adjuſted, he dips the ſtaff in oil and paſſes it gently and ſoftly; he then dips the finger in oil and inſinuates into the rectum, to feel that all is right and fair; he then wipes the fingers that are ſoiled with urine or fæces, or lubricated with oil, and ſeats himſelf before his patient, on a low ſtool, pulling the breech towards him, till it projects fairly over the edge of the table, and preſſing-in the doubling of the blanket under the breech, till he has raiſed it to a proper angle; he then commits the patient's feet to the lateral aſſiſtants, who are to keep the breech in this ſuſpended poſture: Then reaching his right hand over the patient's breech, he takes a firm hold on the handle of the ſtaff; preſſes its heel againſt the perinæum; feels for it immediately behind the ſcrotum with the fore-finger, or with the edge of the thumb; lays down the handle of the ſtaff to the right groin, and gives it to the aſſiſtant ſurgeon to keep it ſteady.

He now wipes the perinæum with his towel *, lays the left hand over the hip and anus, and ſpreads his fingers ſo as to ſtretch the perinæum; then fixing the point of the knife juſt below the point where he feels the heel of the ſtaff, (i. e. about an inch behind the ſcrotum,) and preſſing with the point of the knife to mark the beginning of the inciſion, he draws it with a firm and ſteady motion, obliquely downwards, till he paſſes the anus about an inch and a half, the middle and deepeſt part of the inciſion being thus oppoſite to the anus, but inclining ſomewhat towards the tuber iſchii to avoid the rectum. The firſt ſtroke of the knife paſſes through the ſkin and fat; a ſecond ſtroke, guided by the fore-finger, paſſes deep into the hollow of the pelvis, through fat tendinous faſcia, and the tranſverſe muſcle, and, in ſhort, through every obſtruction, till the opening is quite free. A third diſſection, in which the fore-finger is turned upwards to the pubis, while the

* The rectum generally protrudes in a child, from crying and ungoverned ſtraining, and needs to be wiped and held aſide by a bit of linen cloth laid upon it.

ring and mid fingers a little crooked repreſs the rectum, lays the ſtaff almoſt bare; and then, the edge of the knife alſo turned upwards, as well as the finger which guides it, is ſtruck into the groove of the ſtaff, through the membranous part of the uréthra; and the knife, being then drawn ſteadily forwards, ſlits it up from the point of the proſtate gland nearly to the bulb of the urethra, i. e. through almoſt the whole length of the part that feels naked.

The edge of the thumb-nail being fixed ſteadily in the groove of the ſtaff, the beak of the gorget is lodged in the groove; the ſurgeon, firſt moving the gorget backwards and forwards, reaches his left hand over to graſp the ſtaff, takes a firm hold of it, riſes from his ſeat, balances with the two hands for a few inſtants, and feeling that the inſtruments correſpond, that the hands feel each other, and re-act mutually, and that the beak of the gorget glides ſmoothly and equably in the groove of the ſtaff, he holds the ſtaff ſteady, clenched in a dagger-like manner, in his left hand, and puſhes the gorget ſteadily, ſtrongly, but ſlowly, forward with his right. The moment that he feels the reſiſtance over, and the urine flow, he begins to give that turn to the ſtaff (viz. depreſſing the handle of it to the belly of the patient), by which the gorget is diſengaged and the ſtaff withdrawn; he ſlips the ſtaff into his pouch, or lays it down, ſeizes the handle of the gorget with the left hand, draws out his forceps with the right, lays the chops of them gently in the broad channel of the gorget, puſhes them gently onwards into the bladder, and when he feels them in the open cavity, he withdraws the gorget, withdrawing it carefully in the direction in which it was puſhed in, that its edge may make no ſecond wound.

The ſtaff is withdrawn as a part of the ſame motion by which the gorget is introduced; the gorget is withdrawn as a part (the concluding part) of the ſame motion with which the forceps are introduced; the gorget is next ſlipped into the pocket of the apron, and both hands applied to the forceps, one to each handle; and the operator, conſcious that the forceps now look directly upwards towards the fundus of the bladder, where the ſtone cannot be, and that the gorget has carried them over the ſtone, raiſes the handles high, and while he opens the blades gently, points them downwards to the ſac behind the proſtate, and near the neck of the bladder where the ſtone lies; and he withdraws them at the ſame time a little, that they may have the ſtone before them: He then puſhes the ſtone before him, and thus excites the bladder to contract, and preſs it cloſe to the chops of the forceps; he cloſes them, and preſſes once or twice in directions ſlightly varied, according to feelings which cannot be deſcribed, before he thinks himſelf ſure of his

hold; but when he is ſure, he graſps firmly, very firmly, becauſe, if the ſtone be ſo large as to endanger its breaking, he is more willing that it ſhould break into a hundred pieces than injure the parts by dilatation; and he now depreſſes the handles quite low, becauſe the direction in which he is to extract the ſtone, is entirely oppoſite to that in which he catches it. The forceps, holding the ſtone, now point directly upwards as at firſt; he holds firm, and pulls almoſt directly downwards, that the preſſure may be, not againſt the pelvis, but againſt the dilatable parts in the lower angle of the wound; and moving his forceps gently, ſlowly, ſteadily, from ſide to ſide, with a very wide motion, he depreſſes, firſt, the upper ſide of the ſtone, then the lower ſide, and ſo alternately, till the wideſt parts of the chops ſtretch the wound! the ſtone begins to appear! he holds the palm of the left hand, which had hitherto held firm the hinge of the forceps, ſo as to receive the ſtone! and with one wide motion of the forceps moving the handles largely downwards, he turns it out.

If the perinæal artery, which is unavoidably wounded, is large, and bleeds profuſely, it is uſually tied with the needle after the external inciſion, and before the urethra is cut. If the hæmorrhagy be neglected till the operation is finiſhed, the arteries are then ſo bruiſed, and ſo retracted among the cellular ſubſtance, that they never bleed again; if there be any internal hæmorrhagy from arteries larger than common, courſing round the proſtate gland, and cut with the gorget, it is diſcovered only ſome hours after the patient is laid in bed; it is known by the deſire to paſs urine, the ſenſe of load at the lower part of the abdomen, and reſtleſſneſs and pain; and it is relieved by puſhing in the finger, and breaking down the coagula, which are then diſcharged as from the uterus in an abortion, and then, if freſh blood continues to flow, farther danger is prevented by thruſting a wide canula into the wound, ſurrounded with a piece of dried ſponge, the canula being paſſed through a hole in the centre of the ſponge.

The ſtone being extracted, the ſurgeon, having examined and aſſured himſelf that there is no ſecond ſtone, lays a piece of oiled lint within the lips of the wound; unbinds the patient, and lays his thighs together, the knees being bended, and, an aſſiſtant holding his hand flat over the wound; and the patient is conveyed to bed, and laid on his right ſide. An opiate is given with a glaſs of warm wine and water; the curtains are drawn, the windows cloſed, and a medical attendant being left by him to watch any acceſſion of hæmorrhagy, or abdominal pain, he is compoſed to reſt; the urine which flows freely through the wound is received upon a thick

folded cloth. The warm bath, glyſters, bleeding, if he be an athletic man, and embrocating the lower part of the belly with ſpirituous applications, are the chief means for preventing abdominal inflammation.

I hope that, in preparing my reader for underſtanding this deſcription, I have with proper ſerioufneſs inculcated the importance of ſtudy, and the fatal conſequence of imitating, without intelligence or deſign, the motions of other operators; that I have not, by any preſumption on my part, incited the young ſurgeon to any raſh or unpremeditated attempt or new exploit, but have deſcribed perſpicuouſly, ſimply, and with a ſincere ſenſe of duty, the moſt important and eventful operation in ſurgery.

To what extent, and with what variety of illuſtrations, a ſubject like this may be explained, it would ill become me to decide. I may have been partial to a ſubject which I have ſtudied for many years, or to theſe views which have preſented themſelves to my mind; I may have erred in explaining, too diffuſely, difficulties which I acknowledge to have felt myſelf, and which it is allowable to believe others may alſo feel. Whether I have written too much or too little, is a queſtion which ſome will be very willing to propoſe; but our general profeſſion, a learned, impartial, and honeſt jury, will decide: but this I am ſure will be allowed me, the merit of good intentions and the choice of a ſubject intereſting in itſelf, and in its relation to many important points of ſurgical practice.

Dissection of the Parts after Death —

The Stone remaining in the Bladder — Page 208.

I. Bell delin.t

W. Skelton sculp.t

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EXPLANATION of the PLATE facing Page 208.

THIS drawing was taken from the bladder of a man who had been cut for the ſtone, but having two ſtones and the ſurgeon being ſatisfied with extracting one, the man died on the eighth or tenth day.

a. Marks a part of the colon naked, uncovered of its peritoneum.

b. b. b. Marks the edges of the peritoneum diſſected ſo as to ſhow the naked gut (*a*) and the fat under the membrane.

c. c. The colon inflated with air turning down behind the bladder to form the rectum.

d. The fundus of the urinary bladder covered by its peritoneal coat, the cut or diſſected edges of which are marked (*e. e.*)

f. f. The outſide of the bladder uncovered of its peritoneal coat.

g. The inſide of the bladder opened by the turning down of the triangular flap (*h*) ſo as to ſhew the remaining ſtone (*i*) and the point of the catheter (*k*) projecting into the bladder.

l. Marks the proſtate gland.

m. The crus penis cut away from the arch of the pubis.

n. The erector penis muſcle cut acroſs.

o. o. The fat ſurrounding the rectum.

p. The anus.

q. q. The extent of the wound made in operating.

r. A probe paſſed through the wound (*s*). The buttoned end of the ſame probe within the bladder.

t. A calcareous cruſt collected round the inſide wound upon the inner ſurface of the bladder.

But the point which I hold it moſt important to demonſtrate, is the great diſtance deſcribed by the dotted lines (*u*) betwixt the outward and inward wound, and the cavity, marked (*v*), betwixt the bladder and rectum, which ſpace was full of matter and gangrenous ſloughs; in ſhort, the whole cavity was a foul abſceſs, and this ſpace, marked (*v*), was in particular green with mortification.

OF

OBSTRUCTION OF URINE.

SECTION IV.

OF INTRODUCING THE CATHETER.

I DO not know that even the operation of lithotomy itſelf, is more difficult, than that of introducing the catheter; more important it cannot be, than an operation which gives relief in accidents and difficulties ſo extremely common and ſo very afflicting: The one is an operation reſerved for thoſe who have attained a high reputation in ſurgery; the other muſt be attempted by every ſurgeon, young or old, in the navy or in the army, in town or country, much or little accuſtomed with operations: It is an operation which the ſurgeon muſt perform unpremeditately, without aſſiſtance or advice, in places diſtant from every help, and in circumſtances too preſſing to admit delay! where, if the patient be left unaſſiſted, even for a few hours, his ſituation will become hopeleſs and irremediable.

The operation of introducing the catheter, if it do not require intrepidity and courage, requires at leaſt peculiar delicacy, a perfect knowledge of the parts, and above all a humane and ſteady temper; for when the ſurgeon is at any time conſcious that he is in danger of committing violence, he muſt ſubmit to the imputation of having failed, even at the riſk of his reputation: The obſtacles and difficulties to the introduction of the catheter are beſides of ſo peculiar a kind, that while all our diligence to learn this art is neceſſary, our utmoſt diligence is ſometimes unavailing, for the moſt unſkilful ſurgeons have ſucceeded, by a ſort of chance, even after the moſt dexterous have failed. Petit failed! Petit and three other ſkilful ſur-

geons attempted in vain to introduce the catheter, which was in the end introduced with all imaginable eaſe by a ſurgeon of very inferior ſkill,—if Petit conſents to make ſuch an avowal, let no man be aſhamed of failing in this delicate operation, nor be induced for the ſake of reputation, to puſh the catheter rudely onwards.

There is no operation with which I ſhould more earneſtly entreat the young ſurgeon to make himſelf acquainted than this of introducing the catheter: Obſtructions of the urethra daily happen, in every ſtage of life, and in all ranks: in the vicious, and in the innocent; in boys, from ſtones paſſing along the urethra; in young men from gonorrhœa, ſtrictures, intoxication, and various kinds of miſconduct. It ariſes too from diſeaſes produced by no immoral vice; often it ariſes from modeſty and reſtraint, from falls affecting the ſpine, from low fevers, from palſy, and from the natural failings of old age; and the proſtate gland, when it becomes diſeaſed, forms a tumor which the moſt ſkilful hand cannot extirpate, nor the moſt ſearching medicines reſolve. So many cauſes for one fatal complaint muſt alarm us, and we muſt feel a peculiar ſympathy in reſpect to this diſeaſe, which preſents itſelf to the imagination (and alas! too truly) as one of the moſt natural failings and moſt afflicting concomitants of old age. Theſe fatal obſtructions are rare in country hoſpitals, and in country practice; for the poor are early ſubdued by hard labour, and have not the deſire nor the means of indulging in any dangerous vice; "they have not, in their youth, applied hot and rebellious liquors in their blood, nor have not, with unbaſhful forehead, wooed, the means of weakneſs and debility." If in the hoſpitals of a great city, ſuch as London, diſeaſes of this nature are more frequent, it is among ſoldiers and ſailors, and the brood of vagabonds that infeſt a capital. But theſe terrible diſorders are moſt peculiarly frequent in the higheſt ranks of life, and eſpecially with thoſe who have rioted in all the luxuries of eaſtern countries; and, in proportion as life advances, thoſe effects of early follies fall heavier every day, and many, exhauſted by ſleepleſs nights and continued pain, have their ſtrength gradually impaired, till at laſt they ſink under the diſorder, without ever having ſuffered a complete obſtruction of the bladder.

There are no circumſtances in which the patient is more perfectly grateful, than for the relief which the ſkilful introduction of the catheter procures; for it is a ſudden and intire relief, from anguiſh more excruciating than any deſcription of pain. Often the value of our aſſiſtance is enhanced by the unſucceſsful attempts of others leſs fortunate or leſs ſkilful. To feel this uneaſineſs and intenſe deſire

to paſs the urine, to ſubmit to a dreaded operation, and yet to be diſappointed of relief; to ſee the blood ſtreaming from the penis, and ſtill to continue in agony; to lie toſſing with fever and pain, aggravated by diſmal recollections of many having died of obſtruction of urine; and then in the midſt of theſe ſufferings, to receive ſudden relief, from the hands of a ſkilful man, muſt be accompanied with a deep ſenſe of gratitude. Such reflections as theſe, my reader will not think unnatural. I would condeſcend to ſuggeſt even ſelfiſh motives, to the few who are born to feel no others, as inducements to ſtudy thoſe diſeaſes of which I am now to offer a ſhort practical ſketch; I ſhould be inclined to blame the ſurgeon very much, who was not equally prepared to uſe the catheter as to uſe the lancet.

The introduction of the catheter is an operation which a good ſurgeon, who is able to perform with eaſe, would be apt to deſcribe with little care or minuteneſs; and there is unfortunately in this, if any part of ſurgery, a kind of addreſs which is to be attained only by practice! for let the experienced ſurgeon pay what attention he will to his own manœuvre, he will find ſomething in it which he muſt deſpair of teaching by words alone. Yet this experience and acquired dexterity is founded on previous knowledge of the parts, and I ſhall reckon it one of the moſt important uſes of my anatomical drawings and plans, if they enable me on this ſubject to expreſs my conceptions clearly. I ſhall give, as the firſt and moſt ſimple leſſon in this department of ſurgery, that of introducing the catheter, in caſes where the urine is retained, not from any reſiſtance ariſing from tumor or other obſtruction in the urinary canal, but from paralyſis or mere want of power in the bladder itſelf.

When from remaining too long in ceremonious companies, in aſſemblies, in proceſſions, or in courts of juſtice; when from travelling in public carriages, or from any cauſe of delicacy or reſtraint, a man reſiſts too long the calls of nature, the bladder being over-diſtended, loſes its contractile power, and when he would paſs his urine he makes vain and painful efforts to diſcharge it: a ſpaſm about the neck of the bladder then ariſes, and reſiſtance is added to want of contractile power; every repeated effort increaſes the difficulty, and pain ſucceeds to the ſimple deſire of emptying the bladder. It is this pain and ſpaſm alone that prevents the catheter paſſing with perfect eaſe, and makes all the oppoſition we experience in performing that operation on the living body, which is ſo eaſily performed on the dead; for, the introducing the catheter in a corpſe, is not a leſſon of that importance which has uſually been ſuppoſed.

It is the ſpaſm and univerſal contraction of the parts, and in ſome degree the altered poſture of the bladder, in regard to the canal of the urethra, that occaſions this difficulty of paſſing the catheter ; for there are various cauſes from which retention of urine ariſes, in which the difficulty of introducing the catheter is various. The catheter paſſes with perfect eaſe, when the retention of urine proceeds from a paralytic affection of the bladder, as in fractures of the ſpine, in palſy or apoplexy, in confluent ſmall-pox, in the end of low fevers. In child-bed women the retention of urine, which is ſo frequent in tedious labours, ariſes merely from over-diſtenſion, and conſequent paralyſis of the bladder, for it continues many days or even weeks after delivery, after the preſſure produced by the head of the child within the pelvis is removed with them the catheter is eaſily introdueed. Even in caſes when ſtrangury and pain, accompanied with intenſe deſire, have followed the ſimple retention of urine; in caſes when the canal is generally inflamed as in gonorrhœa, the ſurgeon ſhould ſtill be able to paſs the catheter with tolerable eaſe. But in caſes of ſtricture or other diſeaſe in the urethra, the catheter is ſeldom uſeful ; and where the proſtate gland is diſeaſed, it paſſes with the utmoſt difficulty if, indeed it can be made to paſs by any means.

Suppoſe then that a young man has for three weeks been afflicted with gonorrhœa, with much ſcalding and pain, has felt the inflammation gradually deſcend towards the place of the proſtate, and has notwithſtanding had the imprudence to ſit long at table drinking with his comrades, or has been revelling with them all night in the ſtreets, he is brought to you in the morning writhing with pain, or you are called to ſee him at his own houſe, and find him ſtalking through his chamber grinding his teeth, and ſtraining violently to paſs his urine; ſo that in conſequence of the cold, and the liquors he has been indulging in, there has been a quick ſecretion of urine, the bladder is greatly diſtended, there is tumor in the lower part of the abdomen, the penis is in a ſtate of partial erection from pain and irritation, the running ſtopped, the point of the penis quite dry, and the perinæum ſenſibly painful to the touch. You proceed in the following manner :

You place your patient with his back reſting firmly againſt the wall, ſtriding but not very wide, his feet being projected before him a very little ; and you place yourſelf on his left ſide, kneeling on your right knee ; you may lay him acroſs the bed, his feet reſting on the floor, his buttocks touching the edge of the bed, and his head and ſhoulders ſupported with the pillows; or he may ſeat himſelf upon a chair, reſting with his hands upon the ſeat, the perinæum projecting a little over

the edge of the chair, and one of his friends ſtanding behind to ſupport him. In whatever poſture you place your patient, you find the poſture of kneeling on the right knee the moſt convenient for yourſelf; it gives you perfect ſteadineſs; and, by placing yourſelf low with regard to the patient, you obtain a perfect command of your catheter, which, while you are introducing it, is to move in a circle.

You lift the point of the penis betwixt the fore and mid-fingers, ſecuring the poſture of the penis by preſſing the glans with your thumb: then taking the catheter, which is previouſly warmed, and ſmeared with oil, white of eggs, or butter, in your right hand, you hold it firmly by the ears, betwixt the thumb and fore-finger; and while you hold by the wings with the finger and thumb, you lay the middle, ring, and little fingers, flat acroſs the ſhaft, juſt as you would a pipe. You then apply the point of the catheter to the opening of the urethra, and glide it down ſteadily and rather rapidly along the urethra, drawing the penis with the left hand, preſſing the catheter onwards with the right, and guiding it with a ſemi-circular ſweep round the pubis, in proportion as the catheter paſſes along the urethra. The two hands thus re-acting, the catheter glides onwards without obſtruction, till it has turned round the pubis, and you become ſenſible by the turn, by the length it has paſſed, and by the degree of reſiſtance, that it has approached the neck of the bladder, and is juſt about to enter it.

This is the critical moment, in which may be ſeen whether a ſurgeon can or cannot paſs the catheter; for if he knows how to paſs it, he ſuddenly, but not violently, changes its direction. He depreſſes the handle with a particular kind of addreſs, and raiſes the point, which, as if it had ſuddenly ſurmounted ſome obſtacle, ſtarts into the neck of the bladder, and the urine burſts out in a jet from the mouth of the catheter.

Thoſe who are unſkilful preſs the tube forward, and perſiſt, as they had begun, in drawing up the penis, pulling it out to an immoderate length, imagining, as indeed they are plainly told, that by ſtretching the penis, they lengthen the urethra, and make it ſtraight, whereas, they elongate only that part of the urethra along which the catheter has already paſſed.

In truth the elongation of the penis does not at all affect that part of the urethra at which the catheter is interrupted, the part viz. which lies in the perinæum, and is fixed by the various connections with which my reader is not unacquainted: a dexterous ſurgeon indeed generally paſſes the catheter with one continuous motion

uninterrupted, and without letting go the penis; but when he does feel that he is obſtructed he lets go the penis, as of no further aſſiſtance; he, (while his aſſiſtant holds up the ſcrotum,) lays two fingers along the perinæum, on each ſide of the urethra, and draws the fingers along the perinæum towards the ſcrotum, ſoothing the parts, and relaxing the ſpaſm, by the preſſure and motion, and acting as if the deſign were to work the urethra along the catheter, as he would put the bait on a hook. If this fail, he, kneeling before the patient, oils the left fore-finger and paſſes it into the anus, the effect of which is, I am perſuaded, neither the elongation of the urethra, nor the unfolding any inequalities of the canal, but merely lifting up the point of the catheter, by the preſſure of the finger, and with a degree of force and effect which the ſurgeon has not the confidence to uſe in the proper way of bending down the handle of the ſtaff.

This critical movement is ſo deciſive of ſucceſs, that I cannot help illuſtrating it by a plan and explaining it farther: it will be eaſily underſtood from the plan, that if the ſurgeon perſiſt in puſhing the catheter onwards in the direction (a) in which its point firſt meets this reſiſtance, the catheter will, in place of plunging into the bladder, be driven through the thin membranes of the urethra at (a), into the cellular ſubſtance of the bulb, whence will follow an immoderate flux of blood: in place of directing the catheter in ſo unguided a manner as to encounter this obſtruction, the ſurgeon, being aware of this difficulty, muſt be careful to avoid it; from the firſt moment of his introducing the inſtrument, he holds the catheter ſteady by the wings, with the expreſs purpoſe of turning and guiding it; from the moment in which the catheter begins to paſs along the perinæum, the point ſhould be preſſed ſtrongly againſt the upper ſide of the urethra which lies under the pubis; the catheter muſt be all along carried ſo cloſe to the arch of the pubis, as never to loſe the feeling of preſſing hard againſt the bone, and when it approaches the neck of the bladder the point muſt be turned quick under the arch of the pubis, as if it were the ſurgeon's intention to keep it preſſed cloſe to the inner ſurface of the pubis now, as it had before been to the outer ſurface of the lymphyſis. While the ſurgeon makes the point run thus along the bone, as if to avoid the angle at the lower part of the urethra, he muſt guide the catheter ſteadily along, holding it firm and with an action ſomething like that of pulling, as if it were his deſign to hook the pubis. He muſt turn down the handle and raiſe the point of the catheter, I will not ſay ſuddenly, or ſtrongly, but with quickneſs and addreſs, as if it were his deſign to catch at ſome orifice, diſtinct from the canal in which the in-

ſtrument is paſſing, and to catch it with addreſs and quickneſs, as if it were an opening which might otherwiſe eſcape.

If theſe manœuvres do not ſucceed, the ſurgeon changes his catheter, chooſing one bigger or more ſlender, with a greater or leſſer curve, according to what obſervations he may have made in his firſt attempt; but if the catheter has been of a good form or commodious ſize, yet has not paſſed eaſily, he ſhould, inſtead of chooſing a rigid catheter of another ſize or form, take a flexible catheter for his ſecond attempt. The flexible catheter is generally ſlender and of ſufficient length, and its ſhape may be accommodated to all occaſions, and to all forms of the urethra; for, having a ſtiff wire, we can give that wire (either before or after it is paſſed into the catheter) whatever ſhape we pleaſe; and, what is of ſtill greater importance, we can introduce the inſtrument without or with the wire as circumſtances may direct; or what I find far more advantageous, we can introduce the wire particularly ſo as not quite to reach the point of the catheter, but within two inches or a little more of the point, by which contrivance the point, if previouſly warmed and wrought in the hand, has ſo much elaſticity that it follows the preciſe curve of the urethra, and has yet ſufficient rigidity to ſurmount any ſlight reſiſtance. If this too fail, and eſpecially if there be the ſlighteſt reaſon to ſuſpect that the reſiſtance is not merely ſpaſmodic, but ariſes from ſtricture near the neck of the bladder in a younger man, or ſwelling of the proſtate in the aged, we take a ſmall bougie, turn up the extremity of it with the finger and thumb, ſo that the hooked point may look towards the pubis, oil it lightly and rapidly, and allowing no time for the ſoftening of the wax, paſs it into the urethra, run it down nimbly to the place of the obſtruction, turn it with a vertical or twiſting motion, and ſtick it faſt in the conſtricted part; and having left the bougie thus fixed for ten minutes or a quarter of an hour, we uſually find, upon withdrawing it, (eſpecially if, in withdrawing, we feel a pull as if it would invert the urethra,) that either the urine will begin to flow, or at leaſt that the catheter will now paſs.

But when we are in theſe operations unſucceſsful, juſt as when we fail in our attempts to reduce a hernia, we reſort to other means of relieving the ſtricture of the parts, before making a ſecond attempt; firſt we bleed, bleed repeatedly, which at once prevents the moſt fatal of all ſymptoms, inflammation of the abdomen, and ſerves as an anodyne, and never can be ſuperfluous where the future dangers of the caſe, and in ſome degree the preſent obſtruction, proceed from inflammation; when we obſerve the condition of our patient, his fluſhed face, parched tongue, and rapid

pulſe, we can feel no reluctance in bleeding. We immerſe the patient in a warm bath, and rub the perinæum and lower part of the abdomen with ſtimulant embrocations, as ſpirituous and camphorated balſams or ointments; we lay hot and ſtimulant applications to the pubis, cover all the parts with a thick made poultice, impregnated with camphire or onions, and, above all, give opiate injections, very ſtrong, for we find this the moſt effectual means of alleviating the pain and deſire, or in other terms, the ſpaſmodic action of the parts: it is ſpaſm merely that intercepts the catheter; for were the patient dead, no ſuch oppoſition would be experienced; innumerable diſſections have proved that the catheter, which was not admitted in the living, paſſes eaſily in the dead body. If after a few hours of theſe applications, the pain is relieved, and the patient, by the force of the opium, is inclined to reſt, we are then able to paſs the catheter with eaſe; and when we have relieved ſuch a patient we muſt continue our attentions to him unremittingly; we give him prudent advice leſt the ſame continued life of thoughtleſſneſs and diſſipation confirm the complaint; we charge ourſelves with drawing off the urine thrice a day, till the parts recover their tone; and we never diſmiſs ſuch a patient without acquainting him, that on the ſlighteſt exceſs or imprudence, he will relapſe into this painful condition; for the bladder once diſtended is apt to be again diſtended, without creating any ſenſible effort, and, being over-diſtended, it loſes altogether its muſcular power.

The period at which a patient will recover the contractile power of his bladder muſt depend much on the conduct of the ſurgeon, who will be able to reſtore its tone, by being careful in his attendance, and preventing the bladder being at any time filled; by directing the patient to make occaſional efforts to diſcharge his urine, even although not incited by any deſire; by applying ſtimulant embrocations to the pelvis; by giving ſtimulant and purgative injections, or, by giving, if neceſſary, a few drops of tincture of cantharides; and finally by applying bliſters from time to time to the ſacrum, which I hold to be the moſt powerful means of reſtoring the contractility of the bladder: along with theſe means the walking barefooted on a ſtone floor, or having cold water daſhed or ſprinkled about the pelvis, is very effectual in ſeconding the efforts of the patient.

I have thus repreſented the moſt ſimple of all caſes of obſtruction of urine, and ſhall now proceed to ſpeak of others more difficult and complicated. With prolixity or unneceſſary minuteneſs I do not think I ſhall be reproached by any well-diſpoſed or ſenſible man, for I am teaching things which cannot be performed (as

too much has been performed) according to general theory, but ſuch as muſt be either learnt by uſe and practice, or muſt be minutely and practically deſcribed; I cannot on this occaſion, nor ſhall I, in any part of theſe chapters, venture to depend on the natural ingenuity of the young ſurgeon, but ſhall ſervilely and minutely inſtruct him in the manœuvre of every leſſer operation, and endeavour alſo to make him familiar with the ſcenes in which he has to perform his ſeveral duties.

But there remain, in reſpect to this firſt operation of introducing the catheter, ſome points not unworthy of further illuſtration. I remember to have ſeen continually practiſed an artifice which is indeed but lately diſuſed, though if we regard the motives from which it was followed, it ſhould long ſince have fallen into contempt. The ſurgeon, in paſſing the catheter, was in the practice of turning its convex ſide to the pubis, and its point towards himſelf, with the handle downwards; and when the point reached the perinæum and began to be interrupted in conſequence of this moſt unnatural poſture of the inſtrument! at the moment in which it ſhould enter the bladder! the handle was raiſed with a nimble and ſudden turn, and the catheter plumping precipitately into the bladder, in the moment of this ſudden turn, ſeemed to enter in conſequence of the ſingular dexterity of this manœuvre. The whole difficulty of the operation ſeemed to conſiſt in this movement, whence it was called, par excellence, "*Tour de Maître.*" It is natural to inquire whence ſo odd a conceit, as this of turning the catheter in this backward direction, entered into the imagination of any one. Perhaps alſo it is of ſome importance to enquire whether there be not certain circumſtances in which it may be adviſable to make ſuch an experiment.

This *tour de maître* was aſſuredly the invention of the old lithotomiſts in Italy and Germany, and, to eſtimate its value, we have to recollect who theſe lithotomiſts were. Though a barber in thoſe days was a ſurgeon, at leaſt in all that related to tooth-drawing and broken heads, and often ſtood in competition with Hildanus and Paræus; yet a lithotomiſt was not ſo: he was ſometimes a herniary doctor, ſometimes a prieſt, but always a vagabond; for thoſe who profeſſed lithotomy travelled from city to city, and ſtuck up their advertiſements upon the walls. One principal part of the myſtery of theſe itinerants was, to operate ſo that no one could diſcover what they were doing. They performed all the ſteps of their operation with ſuch a juggling dexterity, that the phyſicians, preſent at their opera-

tions, could not guefs what was done; and the moft celebrated among them left to the profeffion no better legacy than difputes about the nature of their operations: in fhort, quacks invented this tour de maître, and furgeons continued to practife it, that their pupils and fpectators, might hold fuch fingular and inexplicable operations in high reverence, and not attempt what feemed fo difficult. Petit, a century ago, remonftrated with his contemporaries againft this abfurdity, declared it to be extremely dangerous to perform this turn with all the rapidity which was ufually affected by fuch as efteemed themfelves dexterous operators, and declared, that he always introduced the catheter over the belly *. Yet even in the prefent day the propriety of the old practice is defended. There is in the fecond volume of the Medical Memoirs, a moft important difcuffion of this very queftion, in which the fole difpute betwixt Mr. Bromfield and Mr. Ware is not whether the tour de maître fhould be performed at all, but how it fhould be performed: Mr. Bromfield advifes us to give the catheter a fudden and very clever turn; Mr. Ware advifes that this mafterly turn fhould be performed with all poffible deliberation and folemnity.

If, in introducing the catheter, you find your inftrument ftop early in a lower part of the urethra, and have reafon, from the hiftory of the cafe, to believe that the obftruction arifes from ftricture, you muft not perfift in preffing on your inftrument, but withdraw it, and pafs a fmall bougie, or ufe a cauftic.

If, in paffing the catheter, you encounter a ftone, which you know by the catheter grating againft it; be not rafh to drive it back into the bladder, but prefs your finger upon the perinæum behind the ftone, left it fhould be driven back,—withdraw your

* "Ces différentes manœuvres, difficiles à décrire, font encore plus difficiles à exécuter que l'on ne penfe. Avant que d'aller plus loin, qu'il me foit permis de demander à ceux qui fuivent la méthode ordinaire, quelles raifons ils peuvent avoir de la préférer à l'autre: plus je réfléchis fur le demi tour de main, et moins j'en connois l'utilité; je dis de plus que la prétendue élégance, de laquelle fe piquent ceux qui font ce demi-tour, ne peut jamais être utile, et qu'elle peut avoir des inconvéniens, fur-tout lorfque, fe piquant de vîteffe, on fait fubitement ce demi-tour, et qu'on baiffe brufquement et prefqu'en même tems la main, pour pouffer le bout de la fonde dans le col de la veffie.

"La méthode de paffer la fonde par-deffus le ventre me paroît fi naturelle, que je ne puis m'empêcher de croire que l'autre façon de fonder *n'ait été imaginée par les anciens Lithotomiftes, que pour mafquer la manœuvre, et faire paroître aux Eleves fpectateurs, qui auroient envie d'entreprendre cette opération, qu'elle eft bien plus difficile qu'elle ne leur paroîtroit fans doute*, s'ils fuivoient la méthode la plus fimple et la plus naturelle: ce que je dis paroîtra vraifemblable, fi on fe rappelle que les anciens Lithotomiftes faifoient cette opération en cachette, ne fouffroient de fpectateurs que le moins qu'il leur étoit poffible, et que quand ils étoient obligés d'en fouffrir quelques-uns, ils cachoient toujours les manœuvres les plus fimples par quelques mouvemens myftérieux."

catheter, and ſtop to conſider of the caſe, and the means of giving ſafe and permanent relief.

But if from the age of your patient and the hiſtory of his complaint you ſuſpect the proſtate gland to be diſeaſed, and eſpecially if, from introducing your finger into the anus, you are aſſured that the complaint is of that diſmal nature, you may, after having failed in the common way, turn the concavity of your catheter towards the perinæum, and give it the turn, the "*tour de maître*," at that point of your progreſs in which you are ſenſible of the oppoſition from the diſeaſed gland and would paſs your inſtrument through it. I have ſometimes imagined that this method of operating contributed to open the cleft or valve-like mouth of the tumid proſtate; and this tour de maître, though abſurd as a general practice, implying nothing but an affectation of dexterity, is ſurely allowable where all attempts are allowable! in a diſeaſe where, if we fail with the catheter, the moſt violent meaſures muſt be reſorted to, and the catheter itſelf or ſome other inſtrument be driven into the bladder by main force.

I am next, I confeſs, anxious to make the due impreſſion on my reader's mind, when I come to explain a prejudice which has indeed almoſt ceaſed to appear in this odious light, from being avowed by men of high reputation and ſupported by facts. It has been aſſerted, that though, upon introducing the catheter, blood flows from the urethra in a full ſtream, "No harm is done; ſuch hæmorrhage is rather uſeful, and facilitates every future attempt to paſs the inſtrument." I will freely acknowledge that often, from a ſlight injury, a great profuſion of blood will flow; this is an inevitable conſequence of the peculiar ſtructure of the parts, and no great harm enſues; but that ſuch a diſcharge of blood is entirely harmleſs, is a ſign of dexterity, or of any thing but aukwardneſs, violence, and a breach of the cellular ſubſtance, I cannot allow.

Every prejudice exculpatory in its tendency, and of courſe acceptable to the profeſſion, will have its ſupporters; and this in particular has long maintained its ground. Mr. Bromfield and Mr. Ware, in the paper already alluded to, acknowledge that, in their own practice, blood often follows the attempt to introduce the catheter; they have pretty plainly inſinuated that ſuch flux of blood is uſeful; and the following tale from Petit has been repeated rather more frequently than it deſerves, becauſe it is one which may be unbluſhingly repeated by every ſurgeon to whom it happens, (as often it muſt happen,) that he fails in his attempt to introduce the catheter, and blood alone flows through the inſtrument in place of urine:

"A merchant in Paris, having been all night tormented with ſtrangury, got up early in the morning and went ſtraightway to his ordinary ſurgeon, who lived but a few doors off: the ſurgeon, after being told the nature of his complaint, proceeded to paſs the catheter. But after giving him exceſſive pain and cauſing an exceſſive flow of blood from the urethra, he refrained from farther attempts, adviſed the gentleman to return to bed, and promiſed that in an hour he would call and take blood from his arm. In place of returning home, he went to the houſe of another ſurgeon of the neighbourhood; who having relieved him by introducing the catheter without violence, or the ſlighteſt degree of pain, he returned to his own houſe, well pleaſed to think himſelf thus perfectly cured, and when his own ſurgeon came to viſit him, he told him that he had moſt providentially paſſed his urine, and that he thought he had beſt defer the bleeding.

"But after dinner he felt the ſtrangury return, he made ſeveral ineffectual attempts to empty the bladder; he went directly to the houſe of the gentleman who had given him relief, who, after letting off a few dry jokes againſt his fellow-ſurgeon, ſet himſelf to work to introduce the catheter; but he occaſioned intolerable pain, and the blood flowed in a full ſtream, ſo that he was forced to let his patient depart unrelieved. So great was the pain he now felt, that he was obliged to go directly home and ſend for his ordinary ſurgeon, ingenuouſly related to him the whole adventure, and this gentleman, who had ſo entirely failed in the morning, relieved him now by introducing the catheter without the ſlighteſt degree of pain or hæmorrhagy."

I am ſorry to ſay that Petit is at great pains to prove that the tumidneſs of the cervix veſicæ was the cauſe of this difficulty, and the unloading of it by this free evacuation of blood, was the immediate cauſe of the catheter paſſing, after each hæmorrhagy, with ſo much eaſe. The inference he draws from this reaſoning is comparatively ſober and ſenſible, viz. that before paſſing the catheter, the patient ſhould be freely bled in order to relieve this engorgement of the cervix veſicæ. But I fear that often the caſe has been quoted in quite another ſenſe, and in vindication of a very common fault. If I am right in my conjecture, or have preſented to my reader a true plan of the direction of the catheter while paſſing the bulb of the urethra, the alternate ſucceſs of theſe ſurgeons muſt be very differently explained;—when blood flowed ſo profuſely, it was by the point of the catheter burſting through the cellular ſubſtance of the bulb; and the fact ſhould have been thus ſtated:

" Whenever theſe ſurgeons (equal to all appearance in unſkilfulneſs) forced the catheter ſo as to bring blood, they could not ſucceed in drawing off the urine, becauſe the catheter had forſaken the courſe of the urethra, and WAS BURIED IN THE CELLULAR SUBSTANCE OF THE BULB! When they had the good fortune to draw off the urine eaſily, no blood flowed, becauſe the catheter WAS IN THE CANAL OF THE URETHRA, AND THE CELLULAR SUBSTANCE OF THE BULB WAS NOT TORN!"

The effect of a tale, in lecturing or writing, is good, for it fixes in the memory any important maxim or rule of practice; but the import of the rule that is to be thus imprinted on the memory, ſhould be an object of ſerious conſideration: the teacher ſhould aſcertain, by deliberate reaſoning, the import of the fact which he is to record by ſuch an illuſtration.

What is the obvious tendency of this tale, ſo often told? to make young men think lightly of this accident! to make them believe that the moſt profuſe flux of blood proceeds from no uncommon injury of the parts! to render them indifferent to the moſt manifeſt marks of their own incapacity and raſhneſs. They who repeat this tale as a vindication of what too often happens, muſt believe that bleeding, from the thruſting in of the catheter, does no harm; that they may perſevere in their attempts to puſh it ſtill deeper; that it is good for the patient to bleed! But the driving the catheter thus into the cavernous body of the bulb, is in my opinion a matter of too much importance to be made the ſubject of a jeſt or merry tale: it may happen, and often does, in the hands of the beſt ſurgeons; but every ſkilful ſurgeon will regret the accident. Surely, if a man unconnected with our profeſſion were to read ſuch a tale as that which Petit has related, he might at the leaſt be permitted to ſay: " It is death to us, gentlemen, although it is play to you."

It has been my fortune, in conſequence of my connection with the young men ſtudying in this univerſity, to be preſent at many awkward ſcenes of this kind; and I am by much experience perſuaded that ſuch a profuſe bleeding is often cauſed by awkwardneſs, where a very ſlight degree of ſkill would enable the ſurgeon to paſs the catheter with eaſe. This, I declare, has happened to myſelf innumerable times; I have been called to a young man, who, from ſitting at table with his idle companions and drinking to intoxication, while his urethra was inflamed with gonorrhœa, has been very ſoon and moſt effectually ſobered by the natural puniſhment of ſuch imprudence:—I have found him ſtalking about his chamber, grinding his teeth in agony, and blood ſtreaming from the urethra, in conſequence of the

mal-adroit attempts of his fellow ſtudents to introduce the catheter. Yet in ſuch caſes I have introduced the catheter with perfect eaſe; and very often it has happened that, the ſtrangury returning in the afternoon, I have been called to the patient, or he has come to me a ſecond time, the blood again ſtreaming from the penis in conſequence of a ſecond attempt by his fellow-ſtudents to perform that operation, which, when performed before them, ſeemed ſo eaſy; and I have on the ſecond time paſſed the catheter as eaſily as at firſt. I have thus, in repeated inſtances, paſſed the catheter with eaſe where the alternate trials made by his friends and companions have produced, in place of relief, nothing but pain and hæmorrhagy. But it no more entered into my imagination that I had ſucceeded only becauſe their attempts had been rude and followed by hæmorrhagy, than that they had failed only becauſe I had been too gentle, and brought no blood.

OF THE VARIOUS CAUSES OF OBSTRUCTION OF URINE; AS STRICTURE, STONE, INJURY OF THE PARTS FROM BLOWS, &c.

OF STRICTURE.

The ſtream of urine ſmall and tortuous, even in the ſound ſtate of the parts, impreſſes us naturally with an erroneous conception of the ſize of the urinary canal. Mr. Home, having injected it with wax, was ſurpriſed to find the roll which repreſented the urethra, ſo large; and I myſelf, when I made the drawing of the urethra, which is in this volume, could hardly believe my drawing at all correct or faithful; for the urethra, though corrugated in the living, is, when expanded in the dead and diſſected parts, full half an inch broad. This canal, made for dilatation, is full of rugæ; and the bigneſs of the ſtones which paſs along the canal, and the ſize of the catheter which it receives with eaſe, intimate to us its natural dimenſions and peculiar conformation, which is ſuch as to enable it to dilate into a large ſac, wherever the paſſage is obſtructed by a ſtone or ſtricture, and the urethra is forced by the propulſive power of the bladder.

It is to no peculiarity of organization, that I would aſcribe the diſeaſe we call a ſtricture of the urethra: I aſcribe it neither to the rugous form of the internal membrane, nor to the muſcular and contractile power with which the whole canal is ſuppoſed to be endowed; though the fact of an occaſional or ſpaſmodic ſtricture, ending in permanent diſeaſe, ſeems to argue this very ſtrongly. As the tumor, which is a wart on the ſkin, is a pile when growing near the anus, or a polypus when in the paſſages of the noſe or throat; ſo that vaſcular action and thickening of parts, which externally would form a tumor, forms a ſtricture in any hollow tube; and the ſtricture is ſtill the ſame, whether it form in the throat, rectum, urethra, or prepuce. This very frequent affection of the prepuce, viz. a proper ſtricture of the part, will illuſtrate in ſome degree the cauſe of this diſeaſe in the urethra. When from any cauſe it happens that the point of the prepuce is kept in a ſtate of irritation, when from the natural cloſeneſs of the prepuce, from uncleanlineſs, from the irritation of mucus in advanced years, from walking or riding much in coarſe clothes, (while a natural tightneſs of the whole prepuce cauſes the point of it to project and receive that friction,) inflammation of the outer circle or ring of the prepuce takes place; and when from ſuch a cauſe an active ſtate of the veſſels commences, a growth, or in other words a thickening, from the increaſing depoſition of parts, begins; thence ſtricture ariſes, and ſtricture once begun cannot but increaſe. This ſtricture of the prepuce is marked by a tumid ring, as hard and firm as the ring of a peſſary, perfectly white, as the ſtricture of the urethra is found upon diſſection to be white; and I have never ſeen this ſtricture of the foreſkin fail to increaſe, and that very rapidly, till an operation was required: in many of the caſes I have ſeen, the point of the prepuce was cloſed, ſo that the urine was daſhed about in an irregular ſtream; and once I ſaw the foreſkin ſo contracted, that the prepuce was converted into a bag almoſt cloſe! the opening in the prepuce bore no manner of proportion to the opening of the urethra, and conſequently the bag filled every time the bladder was emptied! the orifice of the prepuce was ſo extremely ſmall, that I proteſt I could not ſee it; and the obſtruction was attended with this ludicrous circumſtance, that the man who ſuffered from this ſingular ſtricture, being a cobler, was obliged every time he wiſhed to paſs his urine, to thruſt in the point of his awl into this little hole, and dilate it till the opening allowed the urine to paſs. If ſuch ſtricture be a common diſeaſe of the foreſkin, who will venture to ſay that muſcular fibre is alone ſubject to ſtricture, or that the rugous form, or glandular ſtructure of the urethra, throat, or anus, is eſſential to its formation? Let

thoſe, who aſcribe ſtricture to muſcular paſſages alone, think of that ſtricture or contraction of the palm of the hand, which we frequently ſee in people of every deſcription, which hardens the ſkin and tendons, and draws up the fingers like a bird's talon; a ſtricture unaccompanied with pain, frequent in various ranks of life, but ſo peculiarly frequent with mariners, that often one-third of a ſhip's company will be affected with the malady, inſomuch that it ſeems peculiar to certain ſhips. It is a ſtricture from which ſo many thouſands are at this moment lame, that the cauſe and cure is well worth the attention of profeſſional men. Stricture is tumor, and, as a tumor, muſt perpetually increaſe while the circulation ſurvives in the part, unleſs a total adheſion of the canal, by obliterating the cavity, put an end to the action. "When in a ſmall degree, (ſays Mr. Home,) this contraction appears, upon examination after death, to be ſimply a narrowing of the canal at that part; but, when the contraction is increaſed, it *becomes a ridge, projecting into the canal.*" Page 21.

Thoſe who have been troubled with an occaſional or ſpaſmodic ſtricture of the urethra, have every reaſon to fear that it will become permanent: Yet I have often obſerved ſtricture to be merely ſpaſmodic, and I think I have found it often a ſort of febrile diſeaſe. The ſtricture I ſpeak of is more frequent in winter, ariſes from cold, is attended with fever, and is more eaſily cured by any thing than the bougie, which but aggravates the complaint. This febrile ſtricture I have frequently cured in men of the moſt chaſte and exemplary lives, free from the ſlighteſt pollution, married, and of intelligence much above any kind of ſecrecy, where they were once pleaſed to give their confidence, men who never were diſeaſed. The fit of obſtruction is preceded by head-ach, languor, and liſtleſsneſs, while the obſtruction continues; and the acceſſion of the hot ſtage, which comes on in the evening, and eſpecially the paroxyſm of perſpiration, which comes on during the night, is generally a forerunner of relief. I have ſeen the obſtruction ſo complete that not one drop of urine has paſſed, though accompanied with a degree of deſire which urged the patient to place himſelf in the poſture every quarter of an hour, and with ſuch violent ſtraining as produced a partial erection of the penis, whence always the obſtruction became complete, though not ſo before; the bougie being at the ſame time reſiſted at a ſingle point as fairly as if the ſtricture were permanent and organic. I have gone to ſuch a patient at midnight, with catheters and bougies, reſolving to relieve him from the diſtenſion of the bladder: yet feeling a degree of reluctance at uſing harſher means, I have, by ordering a ſharp emetic,

followed up by a ſtrong doſe of laudanum with hot wine and water; by rubbing the perinæum very hard at the ſame time with camphorated mercurial ointment; and by fomenting the lower part of the belly, if neceſſary, with a hot ſtimulant fomentation, or wrapping the parts in a large poultice, been ſaved from doing any thing painful, and have been rewarded for my patience and prudence, by ſeeing the urine diſcharged freely next day, and continue to flow in a full and eaſy ſtream.

I have, after a ſcene of this nature was over, found the bougie paſs with perfect eaſe into the bladder, and have the pleaſure of knowing that many who have been alarmed with theſe ſymptoms have continued for years free from organic diſeaſe, though thus affected from ſpaſm.

The ſudden and total obſtruction which I have juſt deſcribed, is often ſeen in the concluſion, but rarely in the commencement, of proper ſtricture, which uſually betrays itſelf by little accidents, and ſymptoms not at all diſtreſſing. The patient, who has a real ſtricture, whether from venereal complaints, from exceſs committed in warm climates, or from any accidental cauſe, is far gone in this malady before he is conſcious of it. He is firſt thoroughly alarmed by a ſudden interruption of his urine, when, having ſat at table with his friends, he has allowed the bladder to fill beyond its natural and eaſy condition; for that ſtraining which accompanies overfulneſs of the bladder, cauſes a ſtate of half erection of the penis, the cellular ſubſtance thus filled with blood, compreſſes the canal of the urethra, and aggravates any latent ſtricture, till the urine is actually interrupted. The patient, the more he ſtrains, feels the difficulty the more; he but increaſes it by ſtraining, and now obſerves in a particular manner the ſmallneſs and the ſpiral form of the ſtream of urine; from this unfortunate hour his ſituation attracts his attention, and his diſeaſe encreaſes; he recollects that at times, eſpecially after coition, he has had ſuch a degree of running for three or four days as has ſometimes inclined him to believe himſelf infected with gonorrhœa; he has felt occaſionally ſlight pain in the urethra, accompanied with very frequent deſire to paſs urine, which he is in the cuſtom of diſcharging every three or four hours. He now remembers that for ſome time he has been forced to riſe, according to the quantity he drinks at ſupper, three or four times during the night; and all this he would willingly aſcribe to ſpaſm, becauſe organic ſtricture is indeed always accompanied with ſpaſm; the difficulty of making urine, far from being permanent, returns in paroxyſms, is aggravated by cold, increaſes in winter, and in ſummer almoſt

diſappears, is eaſy while the patient is in a warm chamber, is abſent almoſt entirely when he perſpires, returns upon expoſing himſelf to the air, and thoſe paroxyſms, which laſt three or four days, proceed uſually from changes of habit, ſo ſlight, that he can hardly mark the cauſe. But this running like a gleet, returning, upon uſing venery, accompanied with irritation, but never arriving at the virulence of a clap; this occaſional difficulty of paſſing urine and the frequency of the deſire to paſs it, are among the moſt certain ſigns of incipient ſtricture, which ends at laſt, ſometimes in the courſe of a few months, (though often it is delayed for years,) in unequivocal diſeaſe.

This ſcene of ſuffering once begun, is renewed from time to time. The running and the deſire to paſs his water increaſes every time he attempts coition, and he is threatened with abſolute and total obſtruction every time he drinks hard or rides a hunting, or travels poſt, expoſes himſelf to cold, is ſeduced into debaucheries, or any way interrupts the quiet tenor of his life; and when ſtricture is thus confirmed, it is accompanied with new and unequivocal ſenſations, for along with urine the ſemen is obſtruction, coition is attended, in the moment of ejaculation, with a ſpaſmodic action of the accelerator muſcle, creating a ſharp and thrilling pain; though the ſenſe of emiſſion is complete, the point of the penis continues dry; the ſemen recedes into the bladder, and ſometimes is obſerved to flow along with the urine: in this ſtate of things barrenneſs is one conſequence of the obſtruction, though it be in ſuch a degree only as retards, without entirely preventing, the rapid ejection of the ſemen.

Betwixt that obſtruction in which the urine is forced off drop by drop, with violent ſtraining, and that in which the bladder is entirely obſtructed; the limits are extremely narrow, the ſlighteſt imprudence, the being unavoidably expoſed to cold and moiſture, will ſuddenly bring ſuch a patient (like one labouring under hernia) into extreme peril; for after the obſtruction has paſſed a certain point, no ſtraining will force off one drop of urine; nothing but the introduction of the catheter can give relief, and it is not in every village that aſſiſtance can be procured. If the ſurgeon arrives but a little too late, the bladder is diſtended to its utmoſt pitch, and far beyond its natural ſize, the toſſing and uneaſineſs is very great, the abdomen begins to be inflamed, the pulſe is quick, the tongue parched, the lips black, the eyes inflamed, the viſage pale and ghaſtly; and the patient, after twenty-four hours of inſenſibility, or of low and muttering delirium, expires. Thus, in villages and parts remote from help, many valuable lives have been loſt; and when in this

doubtful ſtate, not apparently ill, yet bordering on the greateſt dangers, no officer can go to ſea, no ſoldier can go into ſervice, no country gentleman can retire to his eſtate, without extreme hazard.

Without moſt culpable imprudence the diſeaſe is rarely fatal, but the patient, by the natural courſe of things, falls, if neglected, into a moſt miſerable and loathſome condition; for, from the moment that the obſtruction is nearly complete, the portion of the urethra which lies behind the ſtricture is expoſed to the whole force of the bladder and abdominal muſcles, it is ſoon affected, as an artery is in natural aneuriſm, (i. e.) it is firſt dilated, then inflames, then burſts, then the urine ſpreading (as yet not widely) among the cellular ſubſtance, cauſe indurations of a ſingular hardneſs, as if they were rather knots of callus, gathering round a fractured bone, than inflamed cellular ſubſtance ſurrounding a breach in this thin and delicate tube. Such thickening excited by the urine, forms but a ſlight and temporary barrier to the ruptured part of the urethra; the knot extends and grows, it becomes red on the ſurface and ſoftens, it ſuppurates with little pain, and burſts ſlowly; but when it burſts, the urine iſſues through the opening, the abſceſs ſpreads in various directions; the ſurrounding parts are all affected; the patient often loſes, from mere irritation, the power of retaining his urine, the ulcers and fiſtulas become foul and ſloughy, the linens and the bed are inceſſantly moiſtened with urine. The patient is exhauſted with fits of inceſſant vomiting, and is ſhaken by paroxyſms of fever, apparently peculiar to this diſeaſe, ſuch as make his teeth chatter and the bed ſhake under him during the cold ſtage, and when the ſweating comes on, the ſheets and bed-cloaths, the bed, and even the mattraſs, are ſoaked with perſpirations, and the ſmell of his room reſembles that of a Ruſſian bath. If in this condition he be neglected but a few weeks, or unſkillfully treated, if that fever is combated with bark and emetics, which ceaſes only when proper ſurgical inciſions are performed, if the obſtruction is left untouched, and the ſinuſes unopened, and the matter permitted to work its way deeper among the cellular ſubſtance of the pelvis, the patient ſinks gradually lower and lower, loſes all deſire for food, has a cadaverous and jaundiced aſpect, faints when lift out of bed, and at laſt dies.

If theſe be the diſmal conſequences of this kind of obſtruction, how great muſt be our debt of gratitude to thoſe who have diſcovered a method of cure, or who have improved that method by their ingenuity or diligence. Let it not ſtand as any impeachment againſt Mr. Hunter or Mr. Home, that the uſe of cauſtic and of lancets for piercing ſtrictures are mentioned in the notes of La Faye, and in other

books of the laſt century; ſuch methods were in thoſe times never uſed boldly, ſeldom I am perſuaded, ſucceſsfully. But theſe methods which the old maſters in ſurgery hardly dared to mention, and which have been long neglected and forgotten, have been of late years revived and uſed with a dexterity, boldneſs, and ſucceſs, ſuch as to ſave thouſands from a moſt miſerable death; whatever reward the good opinion and confidence of the public may aſſign to thoſe who have by experience and ſkill improved this department of practice, another and more gratifying reward is alſo due, I mean the thanks of our profeſſion, which I, of all its members, am the leaſt inclined to withhold. Mr. Hunter was one whoſe diligence and genius kept an equal pace, and whoſe improvements in the doctrines of adheſion in the operation of femoral aneuriſm, and in the uſe of cauſtic in ſtrictures, ſhould be thankfully acknowledged; and when Mr. Home writes of ſuch a man with pride and enthuſiaſm, he deſerves every praiſe. Mr. Home's introduction to the laſt edition of his book on ſtrictures, is modeſtly and prettily compoſed, it is ingenious in regard to facts, and ſelf-denying in regard to his own merits, which are not ſlight in ſtriving, as he had done, againſt the prejudices of the learned and unlearned; and it is generous in all that relates to the character of his departed friend; it is, in my opinion, an honour not "leſs to the dead, that are already dead, than to the living that are ſtill alive." While I reſerve the privilege of doubting or diſputing with unlimited freedom, particular theories, or even facts, I ſubſcribe to his eulogium, to "his tribute of gratitude, to the memory of Hunter," with a ſincere pleaſure.

Stricture is a tumor or growth, and the ſtriking a firm bougie into the ring, and wedging it there, can do nothing but excite the action, by which the ſtricture is produced. I have ſeen the patient under the old regime, endure much torture, and with wonderful fortitude. The wedging the bougie into a ſtricture, recalls all the feeling to that part, and excites an inexpreſſible deſire to paſs the water, to retain the bougie half an hour at firſt uſing it, is impoſſible; the irritation does not ceaſe when the bougie is withdrawn; after the paſſages are inflamed the mucous flux is encreaſed, the deſire to paſs urine becomes extremely urgent, if the urine paſſes more eaſily at firſt, the relief is but momentary; never can the patient feel relief till after he has learnt to endure the bougie for hours, and continued to wear it for months. To live thus for months or years, is but protracted miſery; and to ſee the ſtream of urine gradually leſſen at every intromiſſion of torture, and to be ſenſible that the diſeaſe, never cured, tends inceſſantly to return, make

the patient deſperate, and he feels that life is not worth holding on ſuch terms. It is this ſtate of protracted torture and diſappointment that affects ſo viſibly, the phyſiognomy, temper, and general health of a patient who has ſtricture; it is this that produces the chagrined countenance, ſallow complexion, and waſted habit; and often it happened, while bougies were uſed, that falſe routes were produced by the irregular preſſure of the point of the bougie, cavities were formed by the ſides of the canal, and the canal itſelf well-nigh obliterated by this new cauſe of compreſſion; the bougie paſſing thus into the cellular ſubſtance by the ſide of the ſtricture, the urethra behind the ſtricture, diluted under the force of the bladder, and the parts fell into a complicated ſtate of diſeaſe.

With this long ſuffering and ill ſucceſs, let us contraſt the effects both immediate and ultimate of the cauſtic bougie. When the cauſtic is preſſed againſt the ring of a ſtricture, none of thoſe ill conſequences predicted by theoriſts, ever are produced; there comes over the patient a confuſion and a ſort of alarm ariſing from the novelty of the ſenſation, which makes the moſt vigorous and hardy man tremble like a hyſterical girl, and ſhiver for ten minutes with the pale and contracted viſage of one in terror. Yet the patient is not in a ſtate of ſuffering; he talks all the while freely, and feels neither any deep ſenſe of burning, or any other deſcription of pain. Nor is there any thing of that immediate inflammation and ſwelling which it was ſo natural for the theoriſt to predict, which it was ſuppoſed would infallibly cloſe the canal, and entirely ſuppreſs the flow of urine, at leaſt for a time. There is indeed very often, a hæmorrhagy, but it is of that kind which has been thought ſo ſlightly of, when it flows from introducing the catheter; and in the preſent caſe alone is ſuch hæmorrhagy deſirable; for, as it is a ſign of the cauſtic having penetrated to the cavernous body of the urethra, it is a ſign of ſucceſs. Neither does the effect of the cauſtic extend along the canal, nor operate, except on that point againſt which it is preſſed; the ſwelling even of the burnt part is not perceptible; the mere act of touching the ſtricture with the cauſtic, inſtantly gives a degree of relief; for the cauſtic KILLS what it touches; there is no intermediate ſtate of inflammation; the part ſhrinks, and the opening, though affected but in a trivial degree, is actually and inſtantly enlarged; in ſhort, THE NAME ONLY OF CAUSTIC IS ALARMING *.

The bulb of the urethra is a natural dilatation of the canal, fit for receiving the

* For a very ludicrous denunciation of dangers to be apprehended from cauſtic by half a dozen of grave and learned doctors and profeſſors, ſee in Mr. Home's book on Strictures, page 5.

ſemen, which is poured into it during coition, and ejected from it by the ſmart action of the accelerator muſcle, in the moment of emiſſion. Immediately behind this dilatation or ſac of the bulb, the urethra, where it enters the bulb, is naturally narrow, and joins the bulb with ſomething like a ring, or natural ſtricture; and it is here, at this point naturally ſtrait, that the ſtricture is formed; a ſecond ſtricture is often found a little beyond this point, about half an inch nearer the neck of the bladder: and whether there be one or more ſtrictures, they lie ſo far down in the urethra, that one, unaccuſtomed to introduce the bougie, would believe that he had paſſed it along the whole canal, and that it had entered the bladder; and when he feels reſiſtance, he would ſuppoſe it to ariſe from the natural ſtraightneſs of the proſtate gland; if there be other ſtrictures than thoſe near the neck of the bladder, they are uſually in the penis, often about the middle, very commonly in that part of it from which the ſcrotum hangs.

It is the number of ſucceſſive ſtrictures that makes the moſt formidable reſiſtance to the paſſage of the urine, and cauſes the moſt cruel diſappointments in the cure; for the firſt ſtricture, that neareſt the bladder, receives almoſt the whole contractile force of the bladder and abdominal muſcles; the ſtream of urine, if there were but this ſingle ſtricture, would be ſmall thread-like, and tortuous; but the force of the bladder being entirely ſpent upon the firſt ſtricture, the ſtream reaches the ſecond with ſo little impetus, that it is quite broken, aud the urine falls away from the point of the urethra without impetus, drop by drop; and I hold this peculiar manner of paſſing the water, as a mark not ſo much of the cloſeneſs of the ſtrictures, as of their number and ſucceſſion, as a ſign of a conſiderable extent of the canal being diſeaſed; for I have obſerved wherever an extent of the canal is affected by fiſtulous ſores, in the cellular ſubſtance of the urethra, the ſame flowing of the urine, without projection, drop by drop. The effect is like that which we produce in tying the arteries of a dead body for injection; for though one firm ligature will not entirely reſiſt the preſſure of our ſyringe, two ſlack ones will ſuffice. The effect is in this reſpect unfortunate, that ſuch reſiſtance excites the whole force of the bladder, which, by being imperfectly emptied and thrown into frequent and violent action, has its coats thickened, its cavity contracted, it becomes irritable, ſo as to contain but a ſmall quantity of urine, and that not eaſily, whence even the removal of the ſtricture (the bladder remaining thus contracted) makes but an imperfect cure. A perſon unacquainted with this department of practice, having applied his cauſtic, and at laſt plumped his bougie

unpremeditately and ſuddenly through a complete ſtricture, would be apt to triumph, but the urine flows not a whit the more eaſily; and upon introducing a bougie as a probe, the ſecond ſtricture is diſtinctly felt.

There is no other evidence of the exiſtence of permanent ſtricture but the bougie, nor is it even a very abſolute teſt, I have found the bougie ſtick firm, as if engaged in a ſtricture, which, after the ſpaſm which ſtopped it had ſubſided, has paſſed with perfect eaſe. I have often ſeen the bougie introduced by the patient, and ſo fixed, either by its point hitching upon one of the lacunæ, or by ſome other accident, that no degree of force could have driven it onwards, whereas, upon withdrawing it a little, and paſſing it on in the true direction, or withdrawing it altogether out, and uſing a freſh and firm one a little larger, it has gone on eaſily to the bladder.

When your own, or your patient's ſuſpicions of ſtricture have gone ſo far that you meet with him to decide the queſtion, you firſt make him paſs his water before you, that you may remark the ſize and form of the ſtream; you next take a bougie of a reſpectable ſize, by no means a ſmall one; and, having oiled and bended it ſomewhat in the form of a catheter, you introduce it before it ſoftens; and always, in paſſing the bougie, whether ſimple or cauſtic, you are quick and dexterous in running it up to the conſtricted part, before it begins to ſoften, which it does very ſuddenly, when affected by the heat of the urethra. You proceed thus: you raiſe the point of the penis with the left hand, you then introduce the bougie with the right, and run it on ſuddenly, till having paſſed the ſcrotum and reached the perinæum, you change your left hand from the penis to the perinæum, you preſs in the points of the fingers of your left hand behind the ſcrotum, and run them back along the perinæum, accompanying, as it were, the progreſs of the bougie; and while you puſh the bougie ſmartly on with the right hand, you preſs in the perinæum with the fingers of your left hand, directing the points of your fingers ſo as to turn the point of the bougie directly upwards, before the anus, at the place where you expect to feel the ſtricture. You feel the reſiſtance and aſſure yourſelf of the ſtricture. You ſatisfy yourſelf that the bougie, in place of going onwards, is curling up under the force of the preſſure, you then withdraw the bougie and find it curled like a pig's tail, but with a point not at all ruffled, becauſe it was never admitted within the ring of the ſtricture, ſo as to receive any impreſſion from it. Either now or at ſome future occaſion, you meaſure the ſtricture, by uſing a bougie ſmall enough to enter into it; you take a ſmall pointed and ſtiff bougie, give it

the bend, introduce it after the ſame manner, but inſtead of ſtopping, for fear of giving pain, you preſs it on and wedge it firmly into the ſtricture, where, if it be preſſed but a very little, it takes a hold and is withdrawn again with difficulty, and with a ſort of feeling as if the urethra were inverted by it. Upon being altogether withdrawn, the wax is found ruffled on the point of the bougie, a ſort of ring marks the part embraced by the ſtricture, and the progreſs which the conical point of the bougie had made in the ſtricture, denotes the ſize of the ring.

The application of the cauſtic really and effectually to the ſtricture thus diſcovered, is no eaſy matter. The moſt dexterous apply it ſometimes twenty or thirty times without ſucceſs, while it happens not unfrequently, that the armed bougie plumps through the ſtricture at the third or fourth experiment. Thoſe bougies which are made in London, are certainly the beſt, for they have a long cauſtic ſecurely lodged, and ſufficiently expoſed; yet I make, armed bougies perfectly ſatisfactory to myſelf, by cutting the pencils of cauſtic nicely, introducing the point of a ſharp pen-knife into the point of the bougie, and turning it vertically, till the centre rolls of cloth, of which the bougie is compoſed, are ſcooped out and the outer circle only left; then the cauſtic being lodged in the hollow and the edges of the cloth, of which the bougie is compoſed, folded over it, a ſmall round knob of the cauſtic is left expoſed, and the bougie which had ſoftened under the modelling of the fingers, is laid by to harden; the edges of the plaſter having then taken a firm hold upon the cauſtic.

When the cauſtic bougie is to be introduced, I like to paſs a common bougie before it, liberally beſmeared with oil, not to aſcertain the place of the contraction ſo much, as to lubricate the paſſage, and make the cauſtic glide quickly to the deſtined point. Then placing the patient, and bending the bougie as juſt directed, you (having oiled the point of the urethra, and ſpread its lips that the cauſtic may not, as often happens, touch the point) glide the bougie down nimbly and quickly down the urethra till it is reſiſted by the ſtricture; you then change the fingers of your left hand quickly from the penis to the perinæum, and there, by preſſing them in ſucceſſion, you direct and work on the bougie with the left hand, and prevent it bending, while you force it into the ſtricture with the right; and all this muſt be ſmartly, nimbly, and dextrouſly done, for the bougie ſoon ſoftens and bends, and you have no longer any power over it: having ſtruck the bougie firm into the ſtricture, you keep it preſſed home againſt it for a few minutes; the patient at firſt feels very little indeed, only the ſlight pain of preſſure, which, however together with

the novelty of the ſenſation and the alarm, makes him blanch and almoſt faint, or at leaſt be ſeized with a cold and trembling fit, ſhaking as if in an ague. The pain is nothing compared with the patient's imaginings; though the name of cauſtic ſounds alarming, the ſenſe of burning which it occaſions is very ſlight, the bougie, after a few minutes, is withdrawn, and the ſlight irritation occaſioned by it ſubſides.

There ſometimes accompanies the application of the cauſtic, a ſlight tinge of blood, a degree of ardor urine, an increaſed deſire to paſs the urine, but indeed the pain and irritation is ſo ſlight, that the patient is contented and eaſy in his mind, and his urine flows more freely than before; he is at all events freed from that apprehenſion which he could not but feel when he thought of having a cauſtic bougie paſſed into the yard. But the ſtream of urine which was a little enlarged by the firſt application, becomes ſmaller again, the cauſtic is again applied, and on the fourth or fifth, or perhaps the eighteenth or twentieth application, ſooner or later, it paſſes through the ſtricture, and the urine, if there be no ſecond ſtricture, flows with perfect eaſe.

The young ſurgeon, in the courſe of his practice, will obſerve and be perhaps alarmed with ſeveral unexpected circumſtances. Firſt, he will ſometimes be alarmed with the apprehenſion of the cauſtic having dropped from the end of the bougie, and often it does actually excoriate a great length of the canal, but the worſt conſequences produced even by this accident, are an unuſual degree of irritation in the courſe of the canal, running, as in a ſmart gonnorrhea of thin and bloody ſerum, a heat of urine, ſlight pain in the perinæum, and ſometimes ſlight pain in the teſticle. I have ſeen large flakes of the lining membrane of the urethra diſcharged along with the bloody ſerum; but the worſt of theſe ſymptoms ſubſide, and in a few days the cauſtic can be applied again. Secondly, he will be ſurpriſed to find, when he chooſes the largeſt cauſtic bougie in order to make ſure of the effects of his cauſtic, that it has actually no effect, for though a large bougie expoſes a greater ſurface of the cauſtic, that ſurface does not come in contact with the ſtricture; a ſmaller bougie is more fairly admitted into the ring of the ſtricture, and has, according to my obſervation, a much happier effect. Thirdly, he will be ſurpriſed with the rude and unuſual ſenſation the bougie conveys to his finger when paſſing through the ſtricture; for at that particular application in which it paſſes through, there is no determined interruption! but in the moment when the bougie approaches the neck of the bladder and is paſſing

through the cauterized ring, it is felt to grate along as if it were paſſing through a ſhot hole in a rough deal board. Fourthly, he will ſometimes be alarmed even by the happieſt preſages; for often there comes on ſo profuſe a hæmorrhagy, that, inſtead of urine, nothing but blood ſeems to run from the urethra, in a full ſtream, as freely as from a vein in the arm, hanging in coagula from the point of the yard. Yet ſuch hæmorrhagies imply nothing but ſucceſs, for they ariſe from the ſloughs having deſtroyed the ſtricture, and penetrated into the cavernous body of the urethra: a profuſe hæmorrhagy, while it is actually harmleſs, is a prognoſtic of a ſpeedy cure.

The horror and ſhivering which the patient, though ſuffering neither fear nor pain, cannot ſuppreſs; a ſhivering ſo violent as to make the teeth chatter audibly, is no ſign, as far as I can diſtinguiſh, either of ſafety or danger, of ſucceſs or failure; but, if any thing, it intimates the ſucceſsful application and action of the cauſtic, for in the ſame patient I do not find the ſame paleneſs or trembling upon introducing the common bougie *. I have ſometimes on the evening after applying the cauſtic, found my patient vomiting from the nervous affection, and ſometimes I have ſeen him, after a long fit of ſhivering, ſlightly delirious, without any perceptible fever. The ſickneſs and delirium reſemble thoſe from intoxication. The ſickneſs of ſo unuſual a kind, that the patient has not time to ſtretch out his hand for the baſon, and the delirium or confuſion of the head accompanied like than of drunkenneſs, with particular ſtupor. Fifthly, the young ſurgeon will be often ſurpriſed to find, while he is deſpairing of ſucceſs, that his patient informs him of his cure, of having paſſed his urine freely and in copious ſtreams, and eſpecially he will be ſurpriſed when informed that the flood of urine has puſhed on before it a ſtone of conſiderable ſize. But in truth, ſtones are often formed behind a ſtricture, from ſmall particles of gravel ſticking there and accumulating; and when the ſtricture is deſtroyed the ſtone paſſes and drops into the water-pot the firſt time the urine is freely diſcharged. The ſurgeon and patient are alarmed at the firſt, by every unuſual ſymptom, are ſoon reconciled to the uſe of the cauſtic, then become familiar, and are at laſt doubtful of any effects bad or good from this application; but a ſurgeon experienced in the uſe of it is not diſmayed, although he perceive no effect after many applications. The bougie often ſtarts unexpectedly through the ſtricture, the fifteenth or twentieth time it is applied; it has been

* In the time of injecting a hydrocele with port wine, or of cauterizing a ſtricture, I have ſeen repeatedly the ſtouteſt man fall back, become pale, and faint like a girl.

applied forty times by the moſt ſkilful without effect, and has at laſt ſucceeded. To mention thus the occaſional circumſtances which accompany the cure is perhaps the ſureſt way of preventing alarm and enſuring ſucceſs.

OF FISTULA IN THE PERINÆUM AND URETHRA.

From theſe ſimple obſtructions I proceed to deſcribe more complicated ſcenes of diſtreſs, ariſing not ſolely from ſtricture, but from any cauſe obſtructing the urinary canal: for whether a ſtone ſticks in the urethra, or by a blow on the perinæum ſwelling and inflammation is produced, whatever cauſe prevents the urine from paſſing freely expoſes the urethra behind the obſtruction, to be dilated, inflamed, ulcerated, or even burſt by the force of the bladder.

It is not to be told what difficult and perplexing forms this complaint aſſumes, how anxious, careful, and curious, the ſurgeon's enquiries muſt be before he can underſtand the extent, form, and other circumſtances of any particular fiſtula; I ſhall therefore be at pains, both by my arrangements and deſcriptions, to give the young ſurgeon clear conceptions of this diſeaſe.

There are three general caſes which demand eſpecial attention:

Firſt, The obſtruction of urine proceeding from ſome violence to the perinæum, from a blow, a fall, or other accident by which, though the ſkin remains entire, the urethra itſelf is lacerated, and the urine, obſtructed in its natural paſſage, burſts, along with the extravaſated blood, into the cellular ſubſtance of the ſcrotum and perinæum, and makes external openings by cauſing a gangrene of the parts.

Secondly, The canal obſtructed by the ſudden impaction of a ſtone in it. The caſe ill underſtood, and the urethra expoſed to the force of the bladder by which it is dilated into a ſac, in which the original ſtone is gradually augmented in ſize, while other ſtones are often generated.

Thirdly.—The fiſtula ariſing ſometimes from ſtricture; ſometimes from venereal or ſcrophulous ulceration, which, in its progreſs, is accompanied with a ſucceſſion of abſceſſes, various openings through which the urine is diſcharged, and extenſive indurations of the ſurrounding cellular ſubſtance; till at laſt, the perinæum and ſcrotum, perforated at various points and diſcharging urine, pus, and flatus from the putrid cellular ſubſtance, reſembles in its livid and indurated form the integu-

ments covering a diſeaſed bone, while the patient is waſted with ſucceſſive paroxyſms of fever and pain; by want of reſt, and by the uncleanlineſs and offenſive ſmell. Let theſe ſlight definitions ſerve to indicate the chief ſubjects of the following diſcourſe.

The membrane of the urethra is delicate and eaſily ruptured, and the cellular ſubſtance ſurrounding it is like a vein full of blood continually circulating in it. The urethra itſelf, or the cellular ſubſtance of the urethra, is often burſt by a blow or fall upon the perinæum, as in trying to leap acroſs forms or chairs, or ſlipping a foot in croſſing a ſtile; or by maſons, miners, or ſailors, falling from a height and alighting among looſe ſtones, or upon projecting beams, or upon the breech of a gun, or the fluke of an anchor. The urethra, or cellular ſubſtance of the urethra, being burſt by a blow, the blood either flows from the penis, or is extravaſated in the perinæum according to the degree of injury.

When the lining membrane of the urethra alone is burſt by the fall, the blood runs from the penis in a full ſtream to the great terror of the patient, who apprehends the moſt horrible conſequences; but it is like that hæmorhagy which follows the rude introduction of the catheter, harmleſs: the blood flows indeed as freely as from a vein, but it coagulates, and the hæmorhagy ſtops of its own accord: it is indeed renewed by the paſſing of the urine, the clots which are in the urethra being forced off in long ſtrings, or bolted out in ſmall knotty coagula; but it ſtops again! and though I have often ſeen ſuch hæmorhagy proceeding from a venereal ulcer in the urethra bleed thus for three days, and though I have at laſt been obliged to lay a compreſs upon the penis and lay it down upon the belly with a bandage to ſtop the hæmorhagy, I never yet ſaw the patient injured by the loſs of blood.

I have had patients run into my room with their pantaloons filled with blood, but I have ſeldom been obliged to uſe preſſure, to which the whole canal of the urethra, and eſpecially the bulb, is ſo fairly expoſed, that no harm can ever happen. When blood flowing along with the urine comes thus from the cells of the urethra it flows in a ſtream; and when coagula are formed they are long, ſlender, and ſtringy; but when the blood flows, as I have ſeen it, from the kidney into the bladder, or from the ulcerated ſurface of the proſtate (a part which is ſurrounded with a plexus of veins), the clots are very condenſed, round, and firm; they obſtruct the urethra and neck of the bladder ſo that the force required for their expulſion is very great; the patient, every time he paſſes his urine, ſtalks about his room in all the agonies that thoſe feel who have actually

the ſtone; and when, after many efforts, the clots are propelled through the urethra, they bolt out to a great diſtance.

When the blow is very violent the bulb of the urethra is completely burſt, blood flows from the penis in great profuſion, and a tumour is obſerved in the perinæum ariſing from the ſame extravaſation of blood. The extravaſated blood, like that of an aneuriſm, makes a rapid progreſs among the looſe cellular ſubſtance of the ſcrotum, which ſwells ſometimes to the ſize of a child's head. The blood is puſhed forward alſo under the ſkin of the penis, till the ſwelling of the prepuce entirely hides the glands; and the blackneſs extends upwards over the belly and down the thighs. A ſurgeon well acquainted with the ſtructure of the parts, even though not ſkilled in this department of practice, will eaſily perceive that the urethra is burſt, and will no ſooner ſee blood effuſed and an extending cochymoſis, which is comparatively harmleſs, than he will apprehend, next an effuſion of urine into the cellular ſubſtance, which is full of danger; and, the moment he ſees an effuſion of urine, he will make no delay but perform thoſe inciſions which are neceſſary to ſave the parts, eſpecially the ſkin of the perinæum and ſcrotum from deſtruction. When the patient feels the ſenſe of paſſing urine ſo diſtinctly that he cannot be perſuaded that it is not paſſing, but by ſeeing the point of the penis dry; when the ſcrotum and perinæum, which were at firſt ſwelled and livid, become puffed up ſuddenly; when the ſwelling, which was at firſt firm and reſiſting, becomes ſoft and gives a crepitating feeling, and eſpecially when no urine paſſes, and yet the patient feels the uſual relief, the ſurgeon may be aſſured that the urine is paſſing into the cellular ſubſtance; that the parts will ſoon fall into gangrene; that the teſticles, and perhaps the penis, will, by the ſloughing of the ſkin, be left naked and expoſed, and the ſkin of the perinæum partly or entirely deſtroyed. Theſe are moſt dangerous circumſtances, and the fate of the patient depends directly and plainly on the talents and diſcernment of his ſurgeon: and there are two modes of proceeding, one of which leads to ſafety and converts a dangerous accident into a very ſimple caſe in ſurgery; the other, of which there are unhappily too many precedents, leads to deſtruction.

If, when the ſurgeon arrives, he is not aware of all the conſequences of the accident; if he do not reflect more upon the effuſion of urine ſoon to take place than upon the preſent difficulty of introducing the catheter; if he calls a conſultation of ſurgeons chiefly to aſſiſt him in the introducing of the catheter, or in conſulting about tapping the bladder! If one or two days are loſt in vain attempts

to introduce the catheter, and in the unmeaning and trivial occupation of applying fomentations, embrocations, and poultices to the parts; the parts fall inevitably into gangrene; and it has actually happened that, while a grave consultation has been deliberating on the means of drawing off the urine, it has been escaping into the cellular substance and causing gangrene; and after gangrene has actually taken place, they have, in a fit of despair and to accomplish they knew not what, tapped the bladder from the rectum; and yet, after all this destruction of surgery and disease has been consummated, the parts have healed in so kindly a manner as to prove that nothing was required but a few superficial incisions to keep the patient in safety.

But if the surgeon, aware at once of all that has happened, and of all that is to ensue, and of the nature of the danger to which his patient is exposed, in place of striving to introduce the catheter, which is far from being essential to the cure, attends only to the breach of the urethra! If he makes such incisions in the perinæum as permit the urine to escape freely, he will save the parts from gangrene: the natural and free passage of the urethra will be spontaneously restored, when the first inflammation subsides: and the incisions made by the knife will heal in a manner very different from that of broad and gangrenous sores produced by extravasation, and connected with the urinary passages.

The structure of the parts and usual consequences then of this accident being considered, the surgeon cannot easily mistake what is to be done.

First, no doubt he is to introduce the catheter: it is the most obvious and easy means of preventing effusion of urine, and restraining the extravasation of blood: and, if the flexible catheter can be introduced and left in the bladder, it will ensure an easy cure. But generally the surgeon will find a degree of obstruction at the ruptured part, which he dares not overcome, and be sensible of the point of his catheter lodging in a sort of sac. When he is conscious that he cannot pass the catheter he will not think of perforating the bladder; if he is to perforate at all, he will perforate the perinæum where already the urine begins to be effused, and where his knife will uncover, and his medicines reach, the ruptured part of the canal. He will treat this case of effusion of urine into the scrotum and perinæum according to the analogy of air effused from the lungs or trachea; i. e. he will take care to provide an exit for the urine which is already effused; and he will be careful to support a free oulet for that which may continue to be discharged till the natural passage for the urine be restored by nature or art. With these

views he will make ſmall inciſions proportioned to the bulk of the tumour; he will place one inciſion in particular ſo over the ruptured part of the urethra (which he can mark by the ſtopping of the catheter there) as to provide in future free egreſs for the urine: Having relieved the parts thus he will expect the ſwelling to ſubſide ſo far as to allow him ſoon to paſs the flexible catheter along the canal of the urethra. In the meanwhile all is ſafe, and, when he is able to introduce the flexible catheter into the bladder and leave it there, the breach of the urethra heals over it, or will indeed heal without the catheter, if the external wound be not tortuous nor fiſtulous but free and open. No poultice nor fomentation ſhould be applied to parts in this condition: they muſt be moiſtened from time to time with vinegar and ſpirits: they muſt be kept dry and clean and wiped at every time they are ſoiled with urine: the compreſſes dipt in ſpirits ſhould be ſupported with gentle preſſure: the wounds, eſpecially that which is oppoſite to the urethra, ſhould not be crammed with lint or other dreſſings, but dreſſed lightly with gentle eſcharotics, as red precipitate mixed in a ſmall proportion with any ointment. The ſloughing parts (if there has been a great deſtruction of parts) muſt be touched lightly with turpentine, not burnt up by a perpetual application of it; and any edges that become particularly callous may be touched with lunar cauſtic. It is ſo eſſential to prevent ill conſequences that the parts endangered by the effuſion of urine be freely expoſed, that I am earneſt in recommending the practice to my reader on all occaſions of this kind. If he will look into Tollet he will find, that he who was a ſtern old ſurgeon and knew his duty made, what fools will miſname ſurgeon's! work he made free inciſions! and, by cutting the parts, ſaved them: delay in circumſtances like theſe is not gentleneſs but cruelty.

Yet theſe are not caſes of fiſtula: there is no long continued diſeaſe, no calloſity, no irregular paſſages through which the urine flows with difficulty; but direct and clean inciſions which ſhould eaſily heal: Nor do I account thoſe ſores to be properly fiſtulous which proceed from ſtones arreſted in their paſſage along the urethra: Yet, when a ſtone ſtops in the urethra and the urethra is dilated behind it in form of a ſac, it is a mere dilatation of the lubricated canal, and the ſurface of the ſac when at laſt it does burſt or is opened is very little diſpoſed to granulate or heal. The ſurgeon who is thoroughly acquainted with the ſtructure of the parts has this unqueſtionable advantage, that, in any given accident, in any complicated caſe, when ſome particular cauſe is producing diſorder and exciting diſeaſe, he reaſons correctly on its conſequences, foreſees all that may happen, and

anticipates whatever ſymptoms it is poſſible to prevent: in the caſe, for example of ſtone either dropping down from the kidney or formed in the bladder, and driven on by the ſtream of urine along the urethra, he will eaſily anticipate the conſequences, or at leaſt underſtand them when they do preſent.

A ſtone, while within the urethra, is puſhed on by the ſtream of urine, but the moment it is delivered from the urethra and lodges in the prepuce the urine no longer urges it forwards; and if the prepuce be narrow the ſtone remains there, and eſpecially in boys, who are unconſcious of the cauſe of their pain and do not ſeek relief, it remains till it acquires an extraordinary ſize. When a ſmall ſtone is thus lodged under a narrow prepuce, the ſtream of urine, being from time to time particularly ſtrong, the ſtone preſents itſelf at the narrow opening of the prepuce, the prepuce then ſuſtains the whole force of the bladder, and is dilated, and, by ſucceſſive dilatations and fits of inflammation, it is made to thicken and grow into a ſac of conſiderable ſize. In a little boy the prepuce has been thus enlarged to the ſize of a French apple, the ſize of the bag and the narrowneſs or ſtricture of its point increaſing in equal proportion, and the ſtone moving within the ſac, like the pea in a cat-call, often preſenting ſo as to obſtruct the urine, and puſhed back by the mother with a pin or bodkin ſo as to give the boy relief by emptying the prepuce. The ſtone has been allowed, from the timidity of parents, to remain for years till it has increaſed from the ſize of a pea to that of a nut, and in men grown in years a ſucceſſion of ſuch ſtones have been formed under the prepuce, one being generated as another was diſcharged. The inconvenience of puſhing ſuch a ſtone back to make way for the urine has been endured for years rather than endure the ſimple operation for the phimoſis, viz. cutting up the foreſkin.

Stones paſſing along the urethra are often interrupted by that narrowneſs of the canal, which is obſervable immediately before the bulb whence they are fixed in the perinæum: often again they are interrupted at the very point of the glans, the orifice being encircled by a ſort of membraneous ring which girds it and makes it narrower than any lower part of the canal. The canal is in all its length betwixt thoſe two points ſo equable in its diameter, ſo lubricated, and ſo dilatable, and the bladder is ſo powerful in its contraction, that the ſtone ſeldom ſtops at any intermediate point, or never longer than a day; during which time the urine paſſes in ſuch quantities by the ſide of the ſtone as to relieve the bladder, while the bladder dilates the urethra, ſo that the ſtone makes its progreſs ſlowly, inſenſibly,

in reſpect of its deſcent, but with great pain. I never knew a ſtone ſtop at any other point than either the perinæum, or the very opening of the glands. I never have found it neceſſary to cut the urethra, nor even to uſe thoſe means, as blowing into the urethra, or dilating it in any other way, which have been ſpoken of ever ſince the days of Proſper Alpinus: in ninety-nine of a hundred caſes, ſtones once enaged in the urethra, paſs along without the help of art; but if they are delayed it is in the perinæum, and it is neceſſary here to tell the conſequences.

When a ſtone actually ſtops in the urethra, it is uſually at the turning of the urethra, under the pubis, at that narrower part where ſtricture uſually occurs. On the firſt day there is a total obſtruction, with intolerable pain, from which the patient has no relief; on the ſecond day the force of the bladder overcomes, in ſome degree, the reſiſtance of the urethra, and urine begins to paſs by the ſides of the ſtone. But while the urethra is ſuffering this preſſure, it is in ſome degree dilated; and if the ſtone be immovably fixed in the urethra, the dilatation increaſes till ſuch a ſac is formed as is capable of receiving the ſtone. Then it rolls back into the ſac and lies there, out of the courſe of the urine, which paſſes at times freely, but at times is interrupted, the ſtone being, by the contraction of the parts, placed oppoſite to the urethra: and thus it happens that the urethra is expoſed from time to time, to the force of the bladder, the preternatural ſac is dilated more and more, and being enlarged much beyond the ſize of the original ſtone, is capable of containing a ſmall quantity of urine. This lateral ſac of the urethra reſembles a ſecond bladder, and other ſtones are formed in it: Now the parts are thickened, the bulk is very perceptible in the perinæum: The patient ſits uneaſily, and ſeldom paſſes urine without interruption and pain: The ſwelling either is in the back part of the ſcrotum originally, or extends that way. The patient, from long habit of obſerving his ſituation, can recollect that often while the urine flows in a full ſtream, he is ſenſible of ſome going into the tumor; and after having paſſed his urine, he can, by ſqueezing the ſwelled part of the ſcrotum or perinæum, preſs out a ſmall quantity of urine extremely fœtid, from being retained in the ſac: often, while the urine is flowing in a full ſtream, he finds it ſtop ſuddenly, from the preſenting of one or other of the little ſtones in the proper courſe of the canal; and that there are ſuch ſtones, he can feel diſtinctly, for as the ſtones are formed in the ſac, and not the ſac moulded upon the ſtones, the ſac is large enough to let them rattle ſo againſt each other, that the patient feels them within the tumor, like thoſe in the crop of a bird.

Having come to have ſome conception of his own caſe, or having been accidentally relieved by the catheter, he learns to keep one in his pocket, and, by introducing it when the urine ſtops, he, by puſhing back the ſtone, gives vent to the urine, and the laſt drops of urine, eſpecially that urine which iſſues from the ſac, are peculiarly fœtid. When ſuch a ſac is opened by an inciſion, ſtones are found in ſome caſes to the number of ſixty or eighty, and the fiſtula is nearly, though ſeldom entirely, cured: why ſuch a ſac is not eaſily cured is obvious, for the formation of ſo many ſtones implies a long continued diſeaſe and calloſity of the parts; the ſac is generated by preſſure, diſtenſion, and ſucceſſive inflammations; there is a remarkable thickening and maſſing together of the parts, and when the tumor is opened the ſurgeon feels, by introducing his finger, that the ſac is ſo ſmooth, ſo lubricated, and ſo perfectly analogous with the inner membrane of the urethra, that it is probably a ſimple aneuriſmal-like dilatation of that canal, ſupported by a thickening of the cellular ſubſtance; and the ſac formed out of ſuch a lubricous membrane is not likely to inflame and heal. The fact is (independent of all reaſoning) that the ſac does not eaſily granulate, but often continues fiſtulous, and requires frequent inciſions, together with eſcharotic applications alternated with poultices, which alternation of ſtimulant and ſoftening applications, keeps all the parts at the ſame time ſoft and ſwelled, and the veſſels in an active ſtate.

Theſe ſacs are not ſmall and thin in their walls, as the dilatation of the canal of the urethra gives the idea of a ſmall and delicate ſac; for no part of the human body enlarges by mere diſtenſion, no part grows thinner as it enlarges. Diſtenſion excites the action of the veſſels; the increaſed action of the veſſels cauſe an increaſed nutrition or ſecretion of parts, and thence parts thicken as they are dilated. The urethra then being dilated, thickens, makes a cloſer connection with the cellular ſubſtance and ſurrounding parts, and the tumor produced is not a mere ſac but a maſſive thickening.

That ever it ſhould be allowed to grow to any great ſize, may appear ſurpriſing, but let us reflect on this, that even external tumors, attended with obvious deformity and manifeſt danger, conſtantly attracting the eye and ſoliciting the attention of the patient and his friends, are diſregarded. This is a diſeaſe, which, from its peculiar nature, will be concealed. Country people are ſo inattentive to their health as not to aſk advice, and ſo ignorant as not to ſuſpect the cauſe of their pain. They have, from their way of life, a coarſeneſs of feeling, a want of ſenſibility, an indifference to all ſlighter inconveniences, and they are remote

from aſſiſtance; and on the Continent eſpecially, their condition is very little regarded; beſides the ſtone when thus fixed in the perinæum, lies pretty ſolid and occaſions nothing of that extreme pain which it would be attended with if lodged in the bladder; thence it has often happened that a ſtone ſo engaged in a ſac, has been allowed to increaſe for years and attain the ſize of an egg. From its protruſion the tumor is apt to be injured, and from the great ſize and mere gravitation of ſuch a ſtone, the ſac is apt to inflame and ulcerate. Country people have been ſo ignorant of the nature of their complaint, as to go on horſeback with a ſtone thus lodged in the perinæum, whence the perinæum has been ulcerated, and the ſtone projected ſo as to be felt and pulled away with the fingers; and ſometimes ſo violent an inflammation has (without any very particular cauſe) extended itſelf over the whole ſurface, as to terminate in gangrene of the perinæum, ſcrotum, and verge of the anus, the ſtone falling into the water-pot, upon the burſting of the ſloughs, to the great confuſion of the ignorant patient.

Perhaps it may not be irrelevant to mention here, among the diſeaſes of the urethra, an accident which is ſhockingly frequent: little boys who in their dreams wet the bed, have often, to avoid the ſhame and the puniſhment of ſuch a fault, tied tapes about the penis, and, unable to undo the knot in the morning, have concealed their ſituation; and I have known parents ſo fool-hardy as to do this, and have ſeen the penis cut half acroſs. It is always the lower ſide of the penis, or that on which the urethra lies, which ſuffers; and the only remark which I have to ſuggeſt is this, that I have never ſeen any good done by attempts to re-unite the parts at the time of the injury. That the applications of cantharides, red precipitate, and other irritating applications, in place of aſſiſting the re-union, or procuring granulation, have invariably widened the breach. I adviſe that the parts be ſuffered to heal; that if any thing be introduced into the urethra, it be only a leaden probe; and that all attempts at healing the breach, be deferred till the parts are ſkinned over, the inflammation entirely gone, the oriſice callous; and then, by paring and ſcarryfying the edges, retracting the ſkin of the penis, ſecuring it by adheſive plaſters, and introducing a flexible catheter, it may be really cured.

Theſe are accidents comparatively rare, to omit the mention of them would indeed be wrong, but to repreſent them as frequent cauſes of fiſtula, would be to deceive my reader; let us turn then to matters of daily practice.

That inflamed, indurated, and confuſed ſtate of the parts, where the urine having

ceaſed to flow through the natural canal, has burſt through the perinæum in various irregular openings, is the work of time, and proceeds from the ſlow operation of ſome continued reſiſtance to the paſſage of the urine: ſtricture, and venereal diſorders of the urethra are the only cauſes which we recognize in common practice. If the interruption of a ſtone paſſing along the urethra, or a blow burſting the canal, produce fiſtula, it is to be regarded rather as an accident, and indeed the diſeaſe is more eaſily cured. Stricture is, in ninety-nine of a hundred caſes, the cauſe of fiſtula; for irritation and frequent deſire to paſs urine is inſeparable from ſtricture, which is continually felt as a foreign body: the frequent contractions of the bladder leſſen its dimenſions, thicken its coats, and increaſe its maſcular power; and thus while the bladder is acquiring daily increaſe of power, and its contractions are becoming every hour more frequent, the urethra is no longer able to bear the preſſure. I do not mean to ſay that the urethra is burſt, as where a ſtone impacted in the urethra totally ſhuts the canal, but it is dilated by the continual force of the bladder, it inflames, the ſurrounding parts are ſoon affected, and thence begins the diſeaſe of the perinæum.

The penis and all the ſurrounding cellular ſubſtance is ſo dull and obtuſe in its ſenſations, that though it is the ſeat of a peculiar kind of ſenſibility, its diſeaſes make great progreſs with little pain, and though ſtricture in the urethra and abſceſs of the perinæum are diſeaſes of no ſlight importance, yet the fact is, that they ſteal upon the patient by ſuch ſlow and inſenſible degrees, that he is hardly aware either that he is labouring under the one diſeaſe, or in danger of the other, before he falls into the moſt calamitous circumſtances. He is indeed ſenſible of the irritation and frequent deſire to paſs urine, but that ſeems not very particular, and at times he can retain his urine for hours. He obſerves the ſtream of urine diminiſhing in ſize, he ſtrains in diſcharging it, he remarks alſo a degree of running from the urethra; but theſe ſigns he aſcribes to ſome former gonnorrhæa, or the imprudent uſe of injections, and hopes they will diſappear. When at laſt the perinæum inflames, and a thickening and hardneſs appears in the courſe of the urethra, he is ſtill willing to aſcribe this to riding, leaping, ſome violent exerciſe, or ſlighter injury, or exceſs in drinking. The perinæum becomes highly inflamed, pain ſucceeds to irritation, the urine is well nigh obſtructed altogether, and the diſeaſe is verging faſt to its moſt dangerous ſtage, before it is diſcloſed to the ſurgeon. It is the reſiſtance at the ſtrictured part of the urethra, that cauſes all this diſorder in the parts nearer the bladder: could the ſtricture be inſtantly relieved, the in-

flammation in the perinæum might ceafe, and often in this ftage there refults from the application of the cauftic the very happieft effects. But unfortunately the patient conceals his complaint from a miftaken delicacy, or he is in the military fervice, and has no good furgeon at hand. He is in fome of the colonies abroad, and is induced to wait till his concerns are wound up, that he may come to Europe with peace of mind to regain his health, or he is long detained at fea without a poffibility of receiving help, and there he falls into the melancholy condition which I am next to defcribe.

There is not in this cafe, as in rupture of the urethra, from a blow or fall, any fudden effufion of urine into the cellular fubftance. The urine is indeed never diffufed among the cellular fubftance, elfe the phœnomena would be entirely different from thofe of fiftula. The cellular fubftance of the urethra is firft condenfed by inflammation, its cells obliterated, and its fubftance altogether hardened, fo as to prevent the urine fpreading abroad; next, the part inflames, abfcefs forms, and then the urine is admitted into the cavity of the abfcefs; and when, at laft the abfcefs burfts, urine and matter iffue from the fame opening. Nor is it all at once, by one abfcefs and one opening, that all this hardening and fiftulous ftate of the perinæum is produced: When firft an abfcefs forms and burfts, almoft the whole of the urine flows through the opening, but in proportion as this firft fiftula clofes and tends to heal, the refiftances are fo balanced that one half of the urine paffes by the fiftula, while the other paffes by the natural canal; but in procefs of time the firft abfcefs heals and tends to clofe altogether, fo that little of the urine flows that way, almoft the whole is difcharged by the penis, but with fo much difficulty, that the preffure upon the difeafed parts in the perinæum is renewed, new abfceffes form, new openings and new fiftulas are produced, and thus, by a fucceffion of inflammations and fuppurations, the parts are fo indurated and maffed together, that the whole of the perinæum refembles a fcrophulous fore; the parts covering the canal of the urethra are knotted and maffed together, like the integuments furrounding a carious or necrofing bone, and urine, and fœtid matter, and flatus, when the fiftula penetrates to the rectum, are difcharged through the various openings.

Nor is it one ftricture that produces this complication of difeafe, for ufually there are two or more, and while one is furrounded with knotty callofities, felt through the fcrotum in the middle of the penis, another, more formidable, with its fiftulous openings leading towards it, is felt in the perinæum.

The cellular ſubſtance of the urethra, whence this calloſity firſt takes its origin, is different from that of other parts; and the knottineſs of it, when thus diſeaſed, is not to be conceived. That callous knot which ſurrounds a ſimple ſtricture, is firm as a pea, and preſſing with your finger and thumb you feel it like a foreign body: when fiſtula is firſt threatened in the perinæum, you may feel the calloſity firm, knobby, and perfectly moveable, and you can move the urethra ſideways, with the finger and thumb, as if the bulb were injected with wax; the preſſure of your thumb ſqueezes out matter, which paſſes into the canal of the urethra, and iſſues from the penis; and ſuch a tumor I have ſeen for many alternate days, almoſt vaniſh; then return again, and at laſt diſappear, whence I am inclined to conclude that ſuch a ſmall abſceſs or blind fiſtula, opening not outwardly, but only into the urethra, varies in ſize according to the quantity of matter contained in it, and ſometimes is cured and obliterated. But when fiſtula occupies that part of the urethra which lies within the ſcrotum, you will generally feel the calloſity inſulated and knobby like a lump of molten lead; I know nothing in the human body it ſo much reſembles as the knot of callus ſurrounding an ill-ſet bone.

I have often, in examining ſuch indurations carefully, and in the daily practice of paſſing the catheter, remarked that upon preſſing particular knobs of the tumor, with the edge of the thumb and ſqueezing them, hard matter was ſpued out from the urethra in great profuſion; I have alſo remarked that ſuch indurations diſtort the canal, for although the ſtricture or other obſtruction be entirely removed, the catheter or bougie paſſes ſuch a part with great difficulty.

From the time that urine begins to iſſue through openings in the perinæum, the diſorder becomes every moment more complicated, and the condition of the patient more loathſome. When the urethra is obſtructed anew, and the perinæum inflames, when either the old fiſtulas are about to burſt out, or new ones are forming, the patient has diſtinct rigours and fever, and clouds do not more certainly portend a ſtorm, than rigour and a feveriſh paroxyſm, the generation of ſome new fiſtula. It is not a ſlight rigour that the patient is aſſailed with, but a cold fit like that of a quartan: the patient feels a ſickiſhneſs, languor, and giddineſs; his face grows pale, and the circle round his eyes livid; and when the fit comes on the bed ſkakes under him, with the violence of the rigour, and his teeth chatter audibly. He vomits a profuſion of bile; his urine is ſparing and high coloured; his temples throb, and the hot ſtage which ſucceeds is very violent, and is followed by a ſweating ſtage, very long and exhauſting. He is bathed in

ſweat, ſhirt after ſhirt is changed, and is actually wrung out before it is thrown into the cloſet. The bed cloths are thoroughly ſoaked. The fætor of the urine paſſing through the fiſtulous ſores and wetting the linnens, and the extreme frequency of paſſing water, and the imperfect manner in which it paſſes, the patient having hardly any degree of retenſion, makes his condition moſt miſerable. His frequent riſing to take the water-pot during the night, while under this ſweating ſtage, gives him cold and aggravates every ſymptom. The patient, after each paroxyſm, looks wan and meagre; he could not in the ſpace of ſeveral weeks entirely recover from the ſhock, but weeks are not allowed him, for one paroxyſm ſucceeds another at intervals of but a few days, bilious vomiting or diarrhæa often occupy the intermediate time, and the ſurgeon, with all his care to preſerve his patient from fever, is hardly able to find two days free from fever, during which he may perform his operations. This is an intermitting fever ſo purely ſymptomatic, that bark or wine, or antimonial medicines, are of little uſe; the patient very generally cannot uſe laudanum which only increaſes his ſickneſs; nothing can give relief but deſtroying the ſtricture and opening the fiſtulas.

The catheter, if it can be paſſed or retained at ſuch a time, is of uſe, by preventing the impreſſion of the urine upon the parts; and extreme cleanlineſs, air, and exerciſe in a carriage, and the warm bath, with opiate glyſters, palliate the diſtreſs till a fit time comes for attempting the cure.

When a patient commits himſelf to your care look well to his condition, reflect maturely on every circumſtance of his caſe, and weigh all the probabilities before you promiſe or ſeem to promiſe a cure; although he has been long labouring under diſeaſe, and the parts are in great diſorder, though the perinæum be perforated with irregular openings, and abſceſſes extend from the urethra to the ſcrotum and hip, you will not deſpair; becauſe, theſe points are acceſſible. But when the cellular ſubſtance of the pelvis is deeply affected, when flatus burſts through the ſeveral openings, demonſtrating that they penetrate to the rectum, though you will never abandon the perſon who puts his confidence in you, you will be cautious how you expreſs your hopes of ſaving him, to his friends.

This is ſo entirely a ſurgical diſeaſe, and the parts are ſo irregularly affected, that natural ingenuity and a ſpirit of enterprize are of infinite uſe, and a nice and careful hand in adapting inſtruments to the condition of the parts, and laying dreſſings ſo as to keep the ſores dry and clean, ſometimes performs wonders. The ſurgeon ſits down to reflect deliberately on the cauſes of the fiſtulas, and of their various

directions and communications, he paſſes firſt the catheter or bougie into the urethra, to feel for the obſtruction, he probes each fiſtulous opening, to diſcover its depth and direction, and its communication with other openings, and to obſerve whether the probe, when paſſed through the fiſtulous openings, and the catheter where it is ſtopped in the urethra, can be made to meet.

He examines carefully into all the circumſtances of his patient's caſe, that he may know in what ſucceſſion the ſeveral openings burſt out, and in what degree the parts have ſuffered. He then tries to get the ſtaff, if poſſible, into the bladder, introducing his finger at the ſame time into the anus, that he may be aſſured whether there is any diſeaſe within the pelvis, and beyond the reach of his knife. On the clearneſs of his conceptions and reaſoning, does the fate of his patient entirely depend; the ſtricture is to be relieved, the fiſtulas laid open, the canal made direct and clear, and the inciſions healed by eſcharotic applications: and, while no diſeaſed part is to be ſpared, nor part, either of the urinary canal or ſurrounding integuments is to be wantonly deſtroyed. In ſhort, care and cleanlineſs, ingenuity and induſtry, a perfect knowledge of the anatomy of the parts, and a mechanical genius for contriving various means of reſtoring the paſſage of the urine, and healing the openings, are of ineſtimable value; they are talents which may be improved and cultivated, and will eventually ſave the lives of patients, who, if laid in a foul bed and macerated in clods of relaxing poultices, would die.

Fortunately there is no doubt nor delicacy concerning theſe operations on the perinæum, which ſeems ſo cruel, and which are indeed ſo often unſucceſsful; the natural force of the urine never could overcome a ſtricture in the urethra, and the perinæum being perforated even that ineffectual force is taken off, the parts are running every moment into greater diſorder; the moſt vigorous health (and that is not to be expected) can never cure thoſe ſores, while the obſtruction in the urethra remains; the ſuppurations are continually ſpreading, and the fever increaſing, ſo that ſomething muſt be done, and ſince that part of the urethra which lies betwixt the ſtricture and the point of the penis is now of no uſe, we may proceed to remove the ſtricture, and ſince the urine has a free iſſue by the perinæum, we are not interrupted in our work.

Theſe general theories of the diſeaſe and of its cure, are of uſe to give the ſurgeon clear conception of the difficulties he has to encounter; but that he may learn how to encounter them, I ſhall proceed to lay down rules for his conduct,

in ſomewhat of an aphoriſtical form.—1ſt, It is not here as in the caſe formerly deſcribed, (viz. a ſudden burſting of the urethra,) the firſt duty of the ſurgeon to make free openings in the perinæum; for the walls of a fiſtula are ſo condenſed by inflammation, that the urine is not injected into the cellular ſubſtance, but flows through one or many openings, whoſe walls are firm and tube-like, as the name fiſtula implies. The firſt care then of the ſurgeon, in every caſe of fiſtula, whether old or recent, is to clear the canal, and that is beſt done by paſſing a cauſtic bougie down the urethra. If there be plainly a ſtricture in the urethra, if the bulb or lower parts are juſt beginning to give way, and the perinæum to inflame, let the cauſtic be applied ſtraightway; or let the common bougie be forced into the ſtricture, to procure a momentary relief, by freeing the paſſage and relieving the perinæum from its immediate preſſure; while leeches and ſaturnine ſolutions are applied to the perinæum, and the part ſupported with gentle preſſure. Sometimes in proportion as the paſſage is cleared by the cauſtic, the pain and ſwelling of the perinæum ſubſide, and the patient is ſaved from a breach in the urethra.

2d, When the diſeaſe has proceeded a point farther, and there is not only an inflammation in the perinæum, and a threatening of danger, but an actual abſceſs; the ſurgeon ſhould make no delay, but open it: there is indeed no danger of the urine being diffuſed widely under the ſkin, but there is danger of the abſceſs extending itſelf, of more cellular ſubſtance being deſtroyed by ſuppuration, and of the urine being admitted into a larger ſac; in ſhort, the abſceſs in perinæo will always be more or leſs extenſive, in proportion as it is more or leſs prudently managed; and it is a point of prudence to open it early. If it could be prevented from ſuppurating, that would be a great point; but, when it has already ſuppurated, and points to a head, when you diſtinctly feel the matter, and ſuſpect, from circumſtances, that the urine has acceſs to the abſceſs, you open it without loſs of time, with the point of a lancet; and let no ſcoundrelly motive of prudence prevent you doing your duty, for there is no doubt that the opening will be difficult to heal, and there is more than a probability that you will ſuffer blame; but while the ſurgeon is opening the abſceſs, let him, at the ſame time, take every meaſure for freeing the natural paſſage.

3dly, In caſes of irregular and complicated fiſtula which has continued long, when little urine paſſes by the urethra, and much through fiſtulous openings, become callous by time; where there is no threatened diſeaſe, which may be prevented by timely inciſions; where either the ſurgeon feels plainly one long and

formidable ſtricture, or ſuſpects various obſtructions in diſtinct parts of the canal, he will give firſt his whole attention to the clearing of the natural paſſage, that he may afterwards deal more ſucceſsfully with the fiſtulas.

His means of overcoming ſuch ſtrictures, muſt be adapted to the circumſtances of each. If he has reaſon to believe that there is but one ſmall and ſolitary ſtricture, he will perhaps hope to give a temporary relief, by forcing the point of a bougie into it, and thus, for a moment, taking off the force from the perinæum, he may gain time for the uſe of the cauſtic, and be able in a more deliberate way, to deſtroy the ſtricture altogether, and reſtore the free ſtream of urine. If, from the hiſtory of the complaints, and a diſtinct account of what has been done by former ſurgeons, if from the entire obſtruction of the urine, from the extenſive fiſtulas and long continued diſeaſe in the perinæum, he has reaſon to believe that the ſtricture is very compleat; but eſpecially if upon feeling the urethra, he is ſenſible that the obſtruction ariſes, not from a ſingle ſtricture, hard and round like a pea, at one point of the urethra, but from ſeveral contiguous ſtrictures occupying a conſiderable length of the urethra; if, to ſpeak more accurately, he feels with the finger and thumb, a ſpace of the urethra, nearly half an inch in length, ſmall and hard, like a big thread, at which the bougie or catheter ſtops, he has reaſon to fear, that not a hundred applications of cauſtic would deſtroy ſuch a ſtricture, and is ſenſible that he muſt have recourſe to rougher methods. He introduces the ſtalk of a ſilver catheter, the bend being cut ſmoothly off, and uſing it as a canula, he plants the point of it upon the ſtricture, and paſſing down a trocar or piercer, either ſquared or lancet-pointed, and graſping the urethra firm in his left hand, and holding the piercer firmly with his right, he bores it along, (a thing which cannot be done without much force and exquiſite pain to the patient) and makes his way through the ſtricture, indifferent whether it paſſes through the body of the ſtricture or by the ſide of it, if only it meet the open part of the urethra. This operation I hold to be chiefly practicable in ſtrictures manifeſtly of conſiderable length, and occupying the middle parts of the urethra, eſpecially that which lies within the ſcrotum; and I have found the operation greatly facilitated, by feeling very carefully from the point where the catheter ſtops, ſo as to aſcertain the extent of the ſtricture, making the patient in the meanwhile preſs his urine, ſo that I would feel the urethra dilated into a ſort of ſac, behind the ſtricture. This ſound and dilated part of the urethra is that which is to be aimed at with the trocar: I have found it neceſſary to hold the urethra and penis par-

ticularly firm, for it requires great force to drive the piercer on: and in this operation of working the urethra along the piercer, as you would put the bait on a fishing-hook, I have, I confess, found the greatest difficulty in hitting precisely the free and dilated part of the urethra behind the obstruction. The lancet-pointed trocar is, I am certain, from experience, preferable to the round or square-pointed trocar, and I think it necessary to mention, that generally and almost necessarily, the trocar must enter the side of the sound part of the urethra, whence there will be a degree of crookedness in the new canal; and if there be any collateral abscess to distort the urethra, the irregularity will be very great, and the catheter will pass this point with a degree of difficulty, and not without some address on the part of the surgeon, who must learn, by practice, towards which side the obliquity lies. To prevent or lessen this, to preserve as far as possible, a direct channel, a large leaden probe as big as the catheter should be worn during the cure, and the caustic occasionally used: this operation of perforating is, I acknowledge, difficult and delicate, but we speak now of cases where bougies are merely a torment, and the caustic ineffectual.

This stricture in the middle of the penis, is usually accompanied with strictures equally formidable near the bulb, the immediate cause of the fistula. These are to be cut with the knife, rather than cauterised, for the fistulas of the perinæum lead directly to those lower strictures, the probe or directory passed to the bottom of the fistula, touches this point; and when the fistula is to be laid open, though it would be wrong where there were no breach, to approach the urethra, it is good practice, when there is an opening in the urethra, and that callous, to make that opening a part of the incision; to pass the staff down till it is stopped by this lower stricture; to pass the directory along the fistula, till it almost touch the staff; to observe well the direction of each, and to cut along the directory till the staff is laid bare.

4th, To attempt any surgical operation on the perinæum, before the free course of the urine is restored, would be but loss of labour, and a wanton destruction of parts; and the moment that the canal is free, the urine, no longer disordering the parts, they shew a tendency to heal, while the bladder itself seems to recover its powers. I have seen a patient, whose incontinence of urine was such as to wet the bed incessantly, and lead me to suspect that the body of the bladder itself was perforated, so relieved, by cauterising or perforating the stricture, that he has retained his urine from night to morning, and from morning till night, passing

two pounds at once. When the operation of the cauſtic is compleat, the ſtricture perforated, or the free courſe of the urine, by any art reſtored, the ſurgeon addreſſes himſelf to the new and arduous duty of healing the ſores, he performs now on the fiſtula in perinæo, the ſame radical operation that he would on the fiſtula in ano, i. e. he lays it completely open. He places the patient as for the operation of lithotomy; examines all the openings once more with the probe, and ſounds their depth, and remarks their relation to the urethra. He then introduces the ſtaff down to the ſtricture in the perinæum, and gives it to an aſſiſtant to hold; he next paſſes the grooved directory, perhaps a little bent, along the main channel of the fiſtula, till it reach the ſtricture, and almoſt touch the ſtaff; he then either runs his ſharp or probe-pointed biſtory, as he thinks beſt, along the directory, or he cuts with a common ſcalpell, till he at once lays open the fiſtula and cuts the ſtricture, making it the laſt part of the inciſion and nicking it fairly. He has now laid ſome length of the ſtaff naked, but, to be aſſured that the ſtricture is completely undone, he puſhes the point of the ſtaff through the inciſion of the perinæum and then paſſes it into the bladder. He then withdraws the ſtaff, and introducing the flexible catheter, or a leaden ſtaff, dreſſes up the inciſions lightly, and perhaps orders a warm ſtimulant fomentation of chamomile decoction ſharpened with ſal ammoniac to be laid over the parts and repeated from day to day to keep them clean and in a pleaſant ſtate; and, though the circumſtances of the caſe ſhould have forced him to lay open a conſiderable length of the ſtaff, he need not be diſmayed, for we frequently ſee ſeveral inches of the urethra (I have ſeen full three inches of it) regenerated, or rather replaced, from the growth of the ſurrounding parts.

In the future dreſſing, though I do not altogether forbid the occaſional uſe of poultices, I do not approve of their being continually applied, the warm bath or ſtimulant fomentations are much to be preferred, while the parts will always be found moſt healthy when kept dry and clean. The ſponge and lint are the beſt dreſſings. The callous parts may be touched with cauſtic; and when the granulating proceſs languiſhes the parts may be animated with red precipitate mixed with baſilicon; ſpirits of turpentine, when not applied too widely ſo as to parch the parts, but touched on with a hair pencil, is often remarkably uſeful; and, the alternating theſe ſtimulant applications with poultices, is particularly uſeful, for the occaſional uſe of a poultice which, if continued, relaxes and indiſpoſes the parts, ſwells them, increaſes their ſenſibility, and expoſes them to the operation of the

turpentine or precipitate. Never let ſuch ſores be crammed even with lint, far leſs with ſtimulant dreſſings, but let the dreſſings be laid on lightly and retained with a (T) bandage. The flexible catheter, if it can be retained, promotes the cure greatly by ſaving the parts from the excoriation of the urine; but it is not to be imagined that the lodging of the catheter within the bladder prevents altogether the urine tainting the parts, for every time the bladder acts (and it acts more frequently and more irreſiſtably when ſtimulated by the catheter) the canal of the urethra dilates ſo, that while much of the urine flows through the catheter, ſome paſſes by the ſide of it and iſſues at the perinæum.

The bathing the parts with ſalt-water contributes to prevent the itching and preſerves them cleanly and granulating, and the uſe of ſea-bathing and exerciſe often contributes to the final cure of ſores which ſeem altogether callous; but it is not to be concealed that often, after the cure of the great fiſtula, and when the perinæum ſeems entirely reſtored to a healthy ſtate and the urethra to be free of obſtruction, one ſmall point continues perverſely open, and can by no means be healed; and the circumſtance of the patient being now reſtored from the moſt melancholy to a comfortable ſituation diſcourages the ſurgeon from making any new attempt.

Definite as theſe rules may ſeem, and ſimple in their application, I ſhould feel that I had executed my duty very imperfectly if I did not enable my reader to aſſociate ſtill more correct ideas with theſe rules, and enable him to apply them with confidence in any given caſe; and this is I apprehend very eaſily done by repreſenting an actual caſe in the form of a plan; and my reader is to underſtand that, in laying ſuch a plan of the diſeaſed parts before him, both in a full view and in profile, my purpoſe is, to enable him to follow me in my reaſonings upon the way in which the ſeveral parts were affected in an individual caſe; I repreſent to him the conjectures I formed in feeling the parts with the finger and thumb aſſiſted by the ſtaff and probe; in ſhort, I preſent to him ſuch a plan of the parts as I ſhould naturally draw for my own private uſe before operating.

In theſe two plans, figures 1ſt and 2d of a complicated ſtricture and fiſtula in perinæo, I repreſent as I have actually felt; 1ſt, A ſtricture about three inches down the urethra; behind that ſtricture a thickening and knotting (a a) of the cellular ſubſtance ſurrounding that part of the urethra which lies within the ſcrotum; nor is it merely a thickening but an abſceſs, from whence, upon ſqueezing particular knobs with the thumb, matter iſſues through the penis. 2dly, A dilated

part behind the firſt ſtricture, which, when the urine advances to the ſtricture and is ſtopped by it, is ſo dilated by the force of the bladder as to be diſtinctly felt through the ſcrotum. 3dy, A ſecond ſtricture in that part of the urethra which lies in the perinæum; but this, in place of having formed an abſceſs opening merely into the urethra, has formed various fiſtulas through which the urine flows by the perinæum; one main fiſtula (b) opens into the perinæum; while another (c) has extended much farther, has made a great abſceſs in the hip, and opens on the point of the hip near the anus.

The patient preſenting himſelf in this ruined condition, the firſt meaſure I take is to open the abſces (c) in the apex of the hip, in order to prevent the farther deſtruction of parts; ſecondly to introduce a trocar by the penis and pierce the firſt ſtricture (1), which is diſtinctly felt to be much too long and too firm to be effected in the courſe of many weeks by a cauſtic; the trocar and canula are puſhed forward till they meet the dilated, but ſound part, of the urethra, marked (2); thirdly, the catheter being paſſed down to the lower ſtricture and the directory puſhed into the fiſtula in the perinæum, the fiſtula is opened by running in a biſtory along the directory, and the ſtricture is included in the inciſion. The catheter is thus laid bare, and then paſſed into the bladder. The lower drawing, or figure 2d, repreſents the diſeaſed parts as they would appear if cut out from the pelvis and laid on a diſſecting board. The ſtrictures and abſceſs are marked with letters or figures correſponding with thoſe of Figure 1ſt; and I would fain believe that it is almoſt ſuperfluous to explain that (d d) marks the corpora cavernoſa penis, at the place of their union. (e) The membraneous part of the urethra below the loweſt ſtricture. (f) The proſtate gland. (gg) The veſiculæ-ſiminales; and (i) the body of the bladder.

The flexible catheter made of elaſtic gum is infinitely preferable to any other; for, after a little while, it ſoftens with the heat and becomes as limber as the natural canal.

OF TOTAL OBSTRUCTION OF URINE AND THE OPERATION OF PARACENTESIS VESICÆ.

I ſhall cloſe this volume with the deſcription of a deſperate operation, which is yet our ſole reſource in the laſt ſtage of miſery. The operation of paracenteſis is

Plans of Fistula & of Enlarged Prostule.

facing Page 254.

Plan 1 of discused Prostule. vide page 275.

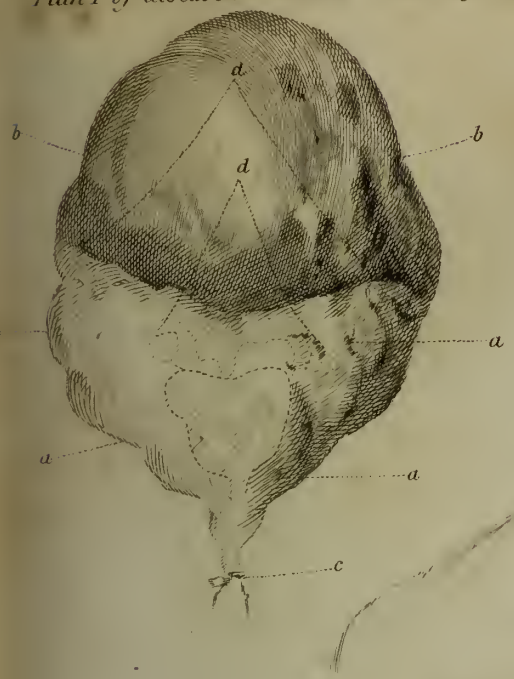

Fig. 1.

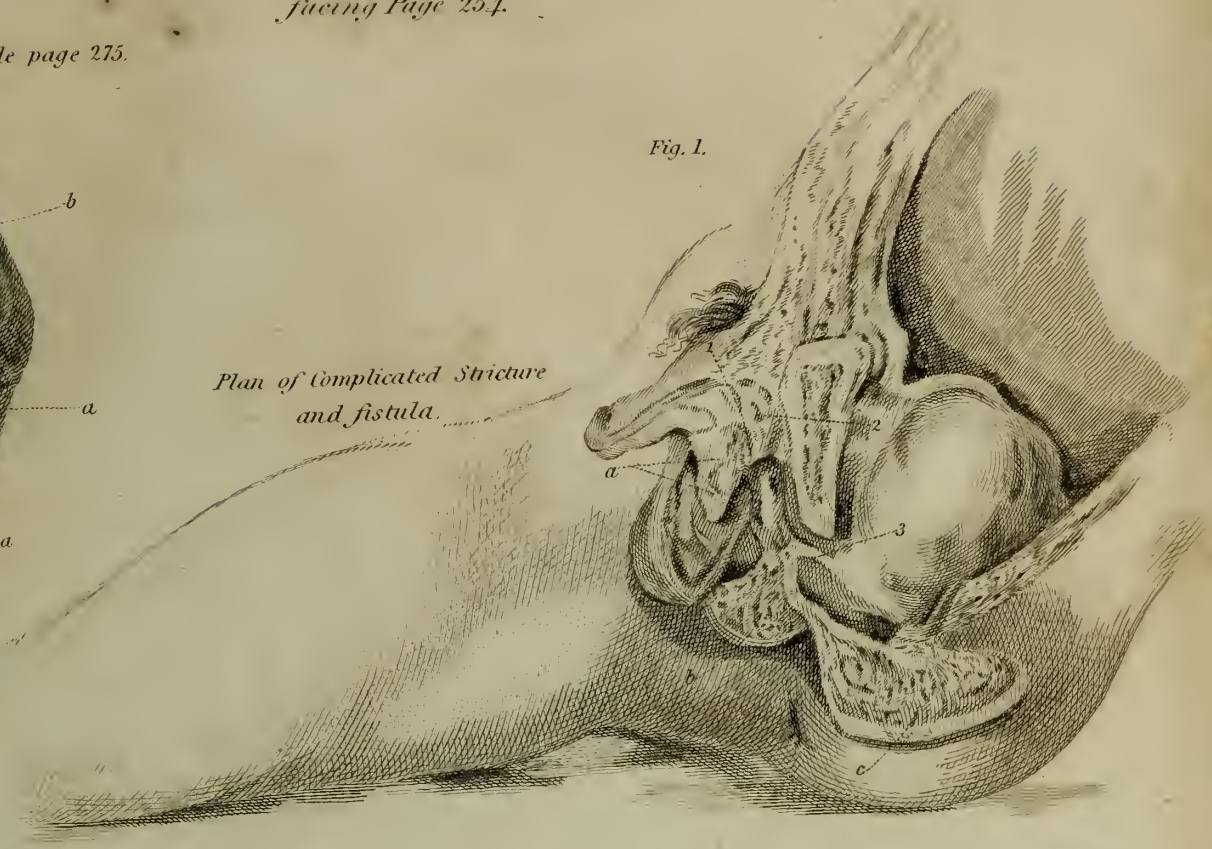

Fig. 2.

Drawn by I. Bell. Published for Longman & Rees & Cadell & Davies June 16th 1804. Engraved by E. Mitchell.

leſs frequently reſorted to as the means of ſaving the lives of young and imprudent people, it is more commonly reſorted to as a means of prolonging the years of the aged and infirm. When in a young and otherwiſe healthy man it happens that, by a blow or fall, the perinæum is injured; or when, from a neglected ſtricture and a ſudden ſuppreſſion of urine with fever, it is neceſſary to perform the operation of paracenteſis veſicæ, the ſcene is very diſtreſſing; but when in a man far advanced in years the proſtate gland has been long diſeaſed and has occaſioned frequent obſtruction; when, at laſt, the bougie gives no relief and the catheter cannot, even with any degree of force or rudeneſs be driven into the bladder, the ſcene is not leſs affecting, for this ſwelling of the proſtate is a diſeaſe almoſt peculiar to learned and ſedentary men; and the patient's age, infirmities, and preſent ſufferings; the dignity with which he ſupports them; the preſence of his family depending perhaps on the ſurvivancy of his offices, and the melancholy diſperſion of his family, which muſt follow his death, create a ſtrong ſympathy. His genius and literary talents give us a particular intereſt in his fate; the operation is, it muſt be acknowledged, but a temporary reſource, yet ſuch a man can bear to linger on a little longer, and, with his family around him, think it happineſs.

It is not poſſible to refrain from alluding to a melancholy ſcene which returns too often not to leave ſerious impreſſions, and it is moſt natural to feel ſome degree of anxiety in trying to reſolve many doubts concerning the proper conduct of the ſurgeon in circumſtances naturally perplexing; where the chief maſters in ſurgery deny us the benefit of their advice and counſel, "I muſt own," ſays one of the firſt ſurgeons of our own country, "that I have not ſeen caſes enough to enable me to give all the varieties that occaſionally happen, and, of courſe, all the advantages and diſadvantages of each method *." But are thoſe who preſume to teach entitled thus to decline giving their beſt advice becauſe every ſuch caſe is full of difficulty and danger? Is it fair thus to devolve the moſt difficult queſtions in our art upon the individual ſurgeon perplexed at once by the delicacy of his ſituation and the ſelfiſh reſerve of authors, whoſe province it is to lay down the plain line of his duty? Whatever preſumption there may appear in offering to explain a ſubject which has been declined by ſo great a maſter in ſurgery as Hunter, I cannot but reflect that this is an operation which may eventually fall to the lot of every ſurgeon to perform; that nothing could be more ungracious on the part of a teacher than to devolve on every young man the difficult taſk of

* Laſſus uſes very literally the ſame expreſſions: "Cette operation ſe faiſante très rarement, on n'a point ſur ſes avantages, et ſur ſes inconvenients, toute l'experience qu'il ſeroit a deſirer, &c." LASSUS, p. 292.

going unaſſiſted through a long proceſs of reaſoning upon the choice of inſtruments or methods, attended with the imminent riſk of thinking too long, or of acting too raſhly: I cannot but recollect that the young ſurgeon coming unprepared to ſuch an operation may make his inciſions in the perinæum deep and wide and yet miſs the bladder, and find no better way of retrieving his error than by performing a ſecond operation by inciſion above the pubis: I have ſeen this, and, to my utter amazement, have ſeen a patient ſo mangled ſurvive.

That a patient ſhould recover who had ſuffered two of the moſt cruel and dangerous of the many operations which have been invented for relieving the diſtended bladder, is a fact which ſets all argument at nought, and is enough to diſcourage us from truſting to reaſoning of any kind. Yet if there be in all ſurgery an operation in regard to which we may allow ourſelves to be guided by principle, it is in this. The experience of the individual may be limited, but the experience of ages is a free and precious ſource of inſtruction. Let the ſurgeon then who preſumes to write on the general ſcience, give, as if he were conſulting on an individual caſe, his beſt and moſt impartial counſel, and where the reſources of his own experience fail, let him collect the ſenſe of former authors.

Though allied with lithotomy, or rather ariſing from it, this operation of paracenteſis is infinitely more difficult to perform; for, while lithotomy has in various ages been performed in various ways, always the inciſions have been guided by a ſtaff, but in puncturing the urinary bladder where no catheter can be introduced, the ſurgeon has no guide but his knowledge of the parts. He does not conduct his inſtrument along the groove of a ſtaff; if he diſſects for the neck of the bladder, he muſt in performing ſuch diſſection, truſt to his knowledge of the parts; if he merely ſtrike the trocar into the bladder, without previous inciſion, ſtill he truſts to his ſkill in anatomy.

The many doubts and fears that muſt come over the mind of the ſurgeon in preparing to perform ſo eventful an operation are only to be divined by reflecting on what has gone before, as well as on the circumſtances of preſent difficulty: many days have already elapſed ſince the patient was in pain and his friends aware of his danger; they are conſcious that his critical ſituation is one in which an inventive head and dextrous hand ſhould be able to do a great deal, and they look up to the ſurgeon at firſt with hope and confidence. But frequent attempts are made to paſs the inſtrument, every renewed attempt promiſes relief, and each diſappointment leſſens the confidence of the relations and of the patient in the operator, or in his art.

Thefe friends are ill prepared, at fuch a time, to receive the intimation that more defperate meafures muft be reforted to, and the furgeon lofes their confidence in the very time when he needs every fupport, when he is to undertake a difficult operation, perhaps by candle-light, with few affiftants, and is obliged to perform it in hafte and trepidation, after the fatal fymptoms of abdominal inflammation are begun! often, as in cafes of hernia, it comes too late to fave the patient's life.

The furgeon, who has to perform in difficult circumftances, a very eventful operation, who has to filence his own doubts and fears, to conciliate the friends, and to confirm his patient in every good refolution, fhould not be left unfupported by fixed and fteady rules of conduct, if fuch can at all be deduced from experience or from reafoning on the ftructure of the parts, he fhould be taught to refolve without delay, and to operate without fear. But while the furgeon is unaffifted by the experience of his elder brethren, he is not inftructed by the hiftory of the fcience, nor taught to make an impartial and juft felection of the methods or inftruments he fhould prefer; fo entirely is hiftory neglected, that I know not where the furgeon could find (independent of any marks of approbation or difapprobation), even a bare and naked catalogue of the various projects for puncturing the bladder. Surely where there have been fo many inventions there muft be many difficulties, there muft be much delicacy in the election of any one method, but it unfortunately happens that modern authors are filent concerning every method but the worft, and that alone is defcribed. Is it not melancholy to obferve, that for the fimple purpofe of tapping the urinary bladder, incifions are performed equal in extent, and exceeding in danger, thofe practifed for the extraction of the ftone? It was very natural for each lithotomift to adopt a method of puncturing the bladder correfponding, in fome refpects, with that which he ufed in cutting for the ftone; but that of all the various methods one only fhould be remembered! that the trocar fhould be entirely difufed, and the very meaning of the word paracentefis veficæ, or tapping the bladder, be utterly forgotten! that whether in making the opening from the perinæum or from above the pubis, deep incifions fhould be fubftituted to the mere puncture, or made at leaft the firft ftep towards operating with the trocar, is indeed furprifing.

In the furgical fyftems of the prefent day, this is the ufual prologue to the fubject of paracentefis: "The operation of paracentefis veficæ, is to be performed by an incifion in perinæo, in the fame manner as in cutting for the ftone." I hope not: I hope and truft that paracentefis of the bladder will never again be performed

by the ſame inciſions as the lateral lithotomy: how the operation ſhould ever have aſſumed this formidable aſpect, is only to be underſtood from a certain epiſode in the hiſtory of lithotomy, which, I believe, I have not related, or not diſtinctly.

Two hundred years ago the operation of lithotomy had indeed become more familiar, but the diſeaſe was frequent, and the operators few in number. The itinerant lithotomiſts, who went from city to city, viſiting at fairs and in villages, to procure practice, were not proportioned in number to the diſtricts they occupied. They travelled far and wide, ſo that their infrequent return to particular diſtricts, together with the horror of the operation, and the timidity of the peaſantry and lower ranks of people, who could not at all times reſort to cities where penſioned lithotomiſts practiſed, was the occaſion of the ſtone being allowed to remain in the bladder, increaſing, in a courſe of years, to an enormous ſize. No ſtones are now to be ſeen comparable to thoſe preſerved in the old muſæums of Paris and Amſterdam; and the old ſurgeons, when they deſpaired of extracting a ſtone, knowing it to be too large, or when they found it ſo, after having made the uſual inciſions, refrained from introducing the forceps: made no violent attempts to extract the ſtone: but puſhed a large canula into the wound, wrapped round with lint or linen-rag, which canula by keeping the bladder continually empty, by preventing its contractions, and bearing up in ſome degree the weight of the ſtone, gave preſent eaſe to the patient, and preſerved him alive. So familiar did they become with this operation of the canula, that after introducing it, they laid a plate of ſteel over it, introduced a drill or auger, bored the ſtone and burſt it up with wedges; in ſhort they quarried thoſe ſtones which they found too big for extraction, and thus revolved once more, after a long ſucceſſion of ages, the practice of *Ammonius Lithotomus*, who, before the times of Hippocrates, was celebrated for his addreſs in breaking large ſtones. In caſes of diſeaſed bladders alſo, where there was no ſtone nor ſuſpicion of ſtone, the ſame inciſions were made, and the canula involved in linen rags, paſſed into the bladder: and after every operation for the ſtone, the canula was introduced to cleanſe the bladder, and allow the pus to flow off. The operation of the canula was, in ſhort, a favourite reſource in the times of Colot, and even with Le Cat, Morand, and Mareſchall *. This

* "M. Thevenin, chirurgien ordinaire du Roy et chirurgien juré à Paris nous apprend qu'il eſt des occaſions où il ne faut pas eſſayer de tirer la pierre de la veſſie, par exemple, lorſqu' on juge que la pierre eſt trop groſſe, ou que le malade eſt ſi vieux et ſi foible qu'il ne pourroit ſupporter l'effort de la taille, ni la violence des ſymptômes

coarſe and deſperate reſource of the oldeſt practitioners, in the worſt age of ſurgery, is, by a ſtrange fatality, copied into modern ſyſtems, as a moſt meritorious operation, and the deep inciſions and the canula, wrapped round with linen rags, are ſpecified with particular care. This mangling operation is repreſented as the work in which the ſurgeon muſt be engaged, whenever the catheter will not paſs: for this, the ſimple and dextrous operation of paſſing a trocar and canula into the bladder, is abandoned: This is what is called *puncture of the bladder!*

Of all literary men, thoſe of our profeſſion are leaſt in danger from that witty criticiſm of Stern, who ſays, that "Authors make books, as apothecaries make mixtures, by decanting from different glaſſes into one." Authors in our profeſſion are contented with their own ſole experience, and when they wiſh to appear learned, the laſt book, whether it be that of a Le Dran, a Sharp, or a Heiſter, ſerves to the new ſyſtem-maker, as an epitome of the whole ſcience, theory, and practice: ſurely the proceſs, not of compounding mixtures, but of decanting *ſimples* from hand to hand, has drained the ſcience to the very lees, when an author can ſay concerning *puncture of the perinæum*, "That it is to be performed after the manner of the lateral *lithotomy*," and of every other method, "That it is unworthy of notice, and that, without farther conſideration, it ought never to be employed."

The gradual progreſs of the ſcience cannot enrich our art nor be uſeful to ſociety, otherwiſe than by enabling us to compare the opinions of good ſurgeons of former times, with thoſe of the preſent day; and it is the firſt duty of a teacher

qui ſuivroient une inciſion auſſi grande que le demanderoit le volume de la pierre: mais ſi ce corps étranger tombant ſur le col de la veſſie la bouchoit et cauſoit tres-ſouvent un retention d'urine, ou ſeroit obligé de le repouſſer avec la ſonde pour permettre à cet excrément de s'echaper; et comme les frequentes entrées et ſorties de la ſonde, pourroient irriter le paſſage et y cauſer la gangrene, il propoſe l'opération qui ſuit. Il faut ſituer le malade de la maniere qu'on fait au grand appareil, puis introduire une ſonde canelée courbe dans la veſſie, et ſur la ſinuoſité de l'inſtrument ou fait une inciſion comme ſi ou vouloit tirer le pierre, excepté que la plaie doit être beaucoup plus petite. Incontinent après on fait entrer un ſtilet dans la veſſie, le gliſſant le long de la cauclure de la ſonde; ce ſtilet ſert à y conduire une canule d'argent longue de quatres doigts, en le paſſant dans la cavité de la canule: on retire enſuite le ſtilet, et on attache la canule à une ceinture, par un ruban paſſé dans les deux anneaux qui ſont à ſa tête. On laiſſe continuellement dans la plaie cette canule, qui empêche la pierre de ſe preventer d'avantage au col de la veſſie et de flotter de çà et de là, ce qui fait vivre le malade avec moins de douleur juſqu' à ce que ſes forces ſoient rétablies pour ſoutenir la taille: mais quelquefois la canule lui ſera ſi peu incommode, qu'il aimera mieux la porter avec patience, que de s'expoſer à la taille, dont il pourroit mourir. Il faut que cette canule forme à vis pour retenir et vider l'urine quand on veut. On peut par le moyen de cette canule faire commodément des injections dans la veſſie pour beaucoup de maladies auxquelles elle eſt ſujette." Dionis, page 228.

to make an impartial and careful ſelection from among the various methods of operating; but in place of declaiming about the uſefulneſs of this taſk, I ſhall endeavour to perform it.—When we witneſs the death of a patient, whether from fever, from the mortification of ſtrangulated herniæ, or in conſequence of any great operation, we remark equally, in all theſe caſes, certain awful preſages of approaching diſſolution. The pale and ghaſtly viſage and ſunk features; the low and muttering delirium, quick and fluttering pulſe, hiccup, and ſlight convulſion are ſure preludes to approaching diſſolution; and it ſeems as if theſe were but the natural conſequences of the powers of life running low; as if death, from whatever cauſe, were neceſſarily preceded by the ſame ſigns. But after any great operation, in conſequence of which the abdomen is apt to be affected, the ſurgeon, (watching over his patient, with all that intereſt and ſolicitude which his own reputation and the fate perhaps of his friend muſt excite,) will remark a ſucceſſion of very peculiar ſymptoms, which eſtabliſh a cloſe analogy among all the caſes of abdominal inflammation.

When a woman is in labour, and that the hour of her delivery is protracted, many cauſes conſpire to produce inflammation of the abdomen: the abdomen has been diſtended to the utmoſt degree, by the growth of the womb; and the ſtate of the circulation among its viſcera remarkably changed; impatient of this excitement, the abdominal muſcles are at laſt rouſed to action, by a feeling reſembling teneſmus, and continue for ſeveral days to compreſs the womb, preſſing it gradually lower, impacting the head of the child into the pelvis, and diſtending the vagina. When labour is fairly begun, when the parts within the pelvis are at once dilated by the child's head, and bruiſed and compreſſed againſt the bones; when the urine is retained, and the bladder kept diſtended; when the pains of labour ceaſe and return alternately, the parts continuing thus for ſeveral days in a ſtate of diſtenſion and ſuffering, the abdomen at laſt inflames, the pains gradually grow weaker, and at laſt ceaſe altogether; the woman lies quite exhauſted, and faints when raiſed out of bed; ſhe falls into a low and muttering delirium, or, if rouſed to any exertion, (either by ſome ſlight return of the labour pains, or by the endeavours of the accoucheur to aſſiſt her with the lever,) ſhe utters only a faint and delirious ſcream; the face, before inflamed and turgid, with the force of the labour, becomes pale and livid, the abdomen ſwells, and is inſufferably painful to the touch; the pulſe is rapid, weak, and fluttering, the mouth parched, and the lips dry and black; the patient is dying of fever and inflamed abdomen, and if ſhe

can be at all ſaved, it muſt be by being immediately delivered with the lever or forceps.

We muſt acknowledge that many of theſe ſigns cannot be ſo properly aſcribed to inflamed abdomen, as to long continued labour and pain. But in every important ſurgical caſe requiring operation, there are pains and ſufferings equivalent to thoſe of protracted labour. I have watched the patient's ſtate in caſes of hernia, through every ſtage from the firſt moment of ſtrangulation to the hour in which the operation ſhould have been no longer delayed, and from that critical moment to death, through many hours of protracted ſuffering. I have ſeen many die unrelieved, or after operations performed too late, and have always found the analogy of hernia with protracted labour very ſtriking and inſtructive.—When firſt the hernia is ſtrangulated, the free courſe of the fæces is interrupted; the patient is ſickened and begins to vomit; his pulſe is low and weak, his extremities chilled, his countenance or voice are but little affected; but, on the third or fourth day of the ſtrangulation the pains of the abdomen become very acute; the pulſe becomes weak, indiſtinct, and extremely rapid; the lips become livid, the cheeks hollow, and the face ghaſtly; the voice is gone, the breathing is quick and interrupted with long drawn ſighs, a ſort of ſtupor comes over the patient, and except when rouſed and in the act of vomiting, he lies inſenſible; the belly ſwells, and becomes ſo exquiſitely ſenſible, that the ſlighteſt handling of it gives pain.

If a woman in travail is exhauſted by her labour pains, ſo is a patient in hernia, by a want of ſleep, inceſſant vomiting, pain, and fever, and eſpecially by the frequent efforts of the ſurgeon to reduce the inteſtine! the laſt moments of both are the ſame: the ſwelling of the belly, the ſunk countenance, the parched tongue, the frequent vomiting (for the vomiting of hernia continues after the ſtrangulation is relieved), indicate the inflammation of the abdomen; and in both caſes the ſame low delirium and indiſtinct and fluttering pulſe cloſe the ſcene; and as the woman in labour is excited to a delirious outcry, by every attempt to deliver her, ſo is the patient in a caſe of ſtrangulated hernia, rouſed from the inſenſibility to a delirious ſcream, even after the power of ſtruggling with the aſſiſtants is over; he is rouſed to this violence by every thing preparatory to the operation, from the firſt laying him upon the table, to the final act of reducing the inteſtine. In caſes of ſtrangulated inteſtine the affection of the abdomen is always moſt particularly marked, it is the chief danger, and our prognoſtic is to be deduced from the ſigns of this

inflamed ſtate. I have ſeen a woman expiring of femoral hernia, with a tumor ſo ſmall as to be hid in the cellular ſubſtance of the groin, and ſymptoms ſo purely thoſe of abdominal inflammation and exhauſted ſtrength, that were an accoucheur to approach ſuch a woman, impreſſed with the notion of her being in labour, he would find preciſely thoſe ſigns of danger which uſually in his practice, induce him to apply the forceps.

Even when the operation for hernia is performed in happy time, the inteſtine relieved, and the patient's life preſerved, ſhe ſtill is not out of danger: abdominal inflammation once excited, does not eaſily ſubſide: for three weeks the patient is ſwimming for life, with the ſame fever and the ſame torments, (proceeding from inflammation of the abdomen,) that are produced by bad wine, poiſon, or puerperal fever; the face is pale and cadaverous, the pulſe low and quick, 120 in the minute, there is a continual diarrhœa with pain and ſwelling of the abdomen, extreme ſenſibility to the touch, parched lips, a furred tongue, an intenſe thirſt, with frequent paroxyſms of vomiting, as if the ſtrangulation were ſtill unrelieved: the ſenſibility of the abdomen is ſuch, that the patient cannot ſuffer the ſlighteſt preſſure of the bed cloaths: the patient often paſſes the night in a ſtate of low and muttering delirium, and is not ſenſible till thoroughly rouſed. When ſuch a patient dies I find marks of inflammation in all the viſcera of the abdomen, various adheſions of the bowels to each other, effuſions of lymph, as in puerperal fever, and the inteſtines greatly diſtended with air; and when at any time I have ſaved the life of ſuch a patient, I have aſcribed it to the liberal uſe of laudanum and warm fomentations, but moſt eſpecially to repeated bliſters as large as the crown of a hat covering all the abdomen *.

With theſe two caſes of inflamed abdomen, that produced by diſtenſion of the bladder bears the cloſeſt analogy. When we ſpeak of the over-diſtenſion, and of the burſting of the urinary bladder, as cauſe and effect, we are guilty of a palpable ſoleciſm; nothing, I believe, can be more eaſily proved, than that the bladder never is ſo diſtended, as from mere extenſion, to give way; it is not burſt by dilatation, but is inflamed, becomes gangrenous in one ſpot, and then yields. If the bladder can be ſo diſtended, without rupture, as to contain ten pounds of urine! if it be ſo diſtended as to compreſs the inteſtines, fill the whole abdomen, and riſe to the ſcrobiculus cordis, without rupture! if it be thus diſtended by the third

* I hope ſoon to publiſh the prognoſtics and anatomy of inguinal and femoral hernia, and ſhall then deliver a variety of intereſting caſes and diſſections.

day of the ſuppreſſion, and yet continues entire to the eighth or tenth day! if the urine begin to be ſlowly diſcharged from the third day, ſo as to prevent any farther accumulation! how can it be that it gives way from mere extenſion? The expreſſion *over-diſtenſion and the burſting of the urinary bladder*, is ſo common and yet ſo deceitful, that I hold it right to ſay a few words on the dangers of diſtended bladder, which will at once explain this difficulty and complete the analogy betwixt this cauſe of inflamed abdomen, and thoſe other cauſes which I have already deſcribed.

The urinary bladder, which naturally holds a pound and a half of urine, is no ſooner dilated ſo as to contain two pounds, than uneaſy ſenſations are experienced: the deſire of paſſing the water is very ſtrong, and if the deſire be not gratified, if the bladder be ſuffered to be dilated beyond its natural ſtate, it loſes all power, and becomes paralytic. The deſire indeed continues, and the efforts are renewed in painful paroxyſms, with impatience and violence, but the power is gone, and the bladder continues diſtending more and more. If this paralytic ſtate of the bladder happen to a woman in labour, we perceive how eſſential the muſcular power of the bladder itſelf is to the expulſion of urine, and how effectual the force of the abdominal muſcles are in delivering the child, and how trivial that of the womb. The wedging of the head of the child into the cavity of the pelvis, is the firſt cauſe of the urethra being compreſſed and the urine retained, but no ſooner is the bladder thus diſtended than it becomes paralytic; the retenſion of urine does not ceaſe when the preſſure of the child's head is removed; the abdominal muſcles act powerfully, the child is delivered, the womb contracts, but the diſtenſion of the urinary bladder remains *.

* I aſcribe much or almoſt the whole proceſs of labour, the whole power by which the child is delivered, to the abdominal muſcles. In a woman whoſe breathing is injured, labour goes on ſlowly: While ſhe cries (in place of giving effect to the abdominal efforts,) labour is retarded: When her ſtrength is entirely exhauſted, her voluntary efforts ceaſe, and delivery becomes impoſſible: When we aſſiſt with the lever, our efforts are unavailing, unleſs accompanied with labour pains, and we call to our patient to aſſiſt: When the placenta is to be expelled, it is by her voluntary exertions: In ſhort it were as fair to repreſent the expulſion of the fæces as a conſequence of the muſcular powers of the rectum, as to repreſent the expulſion of the child, as the conſequence of the muſcular contraction of the womb. The womb, the rectum, the ſtomach, are ſenſible to thoſe irritations which excite the abdominal muſcles, but are themſelves incapable of ſuch action, as to perform the functions uſually aſcribed to them. So entirely paſſive is the womb in the commencement of labour, that the abdominal muſcles operating, preſs down the womb till it is reſiſted by the brim of the pelvis, and if the pelvis be too wide to give the due reſiſtance, the womb, together with the head of the child, is altogether protruded. In the progreſs of labour, I never felt that contraction of the womb, that ſpaſm which is

When the urinary bladder is ſo diſtended as to fill the whole abdomen; when it reaches the ſcrobiculus cordis, and can riſe no higher; when the diſtenſion is at its extreme, and neither the bladder nor the ſpace in the abdomen can receive more, the general preſſure acts like an expulſatory power, and one of theſe things muſt happen: either the bladder muſt give way and lacerate, which it never does, ſo equally is it ſupported by the preſſure of the ſurrounding parts; or its orifice muſt dilate, and the urine begin to flow. The urine actually begins to flow from the third day of the ſuppreſſion, and whatever urine deſcends from the kidnies is evacuated in ſmall quantities from time to time: on the firſt day of ſuppreſſion the bladder riſes to the pubis; on the ſecond day its fundus reaches the navel; on the third day its fundus riſes to the ſcrobiculus cordis, and from this period it can be no further diſtended, however long the patient ſurvive.

Now this gradual and dribbling evacuation of urine, which empties the bladder, which begins with the full diſtenſion of it and continues till the eighth or tenth day, or till the bladder yields, has been long underſtood by good ſurgeons, and has been eſpecially named by the French writers, "Uriné par regorgement." This evacuation of urine proceeding from over-diſtenſion, is moſt dangerous and deceitful. The friends felicitate themſelves that the urine begins to flow; they communicate their information to the phyſician, which he is too apt to believe; baſins and cloths wet with urine are eaſily produced, but the patient lies unrelieved; and the continued diſtenſion of the bladder is followed by univerſal inflammation of the abdomen: the inſenſibility and low delirium of incipient grangrene, are miſtaken for that relief which was expected from the flow of urine, till either hiccup comes on and the patient dies of fever and inflammation: or the urinary bladder actually gives way, and the acrid urine is poured out into the cavity of the abdomen. Caſes innumerable of this deſcription are to be found in the writings of the older ſurgeons; the quantity of urine correſponds ſo well with the quantity of drink, that the phyſician is apt to be deceived; and Colot tells of many caſes in which, while they believed this *overflow* of urine to be an incontinence, they actually

ſo curiouſly deſcribed; I felt never any ſpaſm but in the muſcles of my own arm, produced by a contraction of the womb, ſo unyielding, that the difficulty of turning ſeemed to me always to proceed from the abſolute indilatability of the womb, which indicates a contraction regularly proportioned to the emptying of its cavity; a contraction not the cauſe of delivery, but the effect; a contraction which is eſſential to prevent flooding, but is by no means ſo to the expulſion of the child.

miſtook the diſtended bladder for an abdominal abſceſs, and made appointments to open it by inciſion.

Let no ſurgeon then truſt to the reports of nurſes or friends, nor partake of their inconſiderate joy, but lay his hand upon the abdomen and tap with the finger, that he may diſtinguiſh the diſtended bladder and the fluctuation of the urine.

Since then the bladder ſuffers no farther diſtenſion from the third day, why ſhould it burſt? Not from laceration, for it is ſupported by the uniform preſſure of the ſurrounding viſcera, and the general tenſion of the abdomen: not by yielding ſuddenly, for it is diſtended to its utmoſt on the third day of ſuppreſſion, and yet ſeldom gives way before the tenth: not by attenuation, as a ſubſtance merely elaſtic gives way fibre after fibre, or burſts ſuddenly, for the bladder, even more than the womb, increaſes in thickneſs in proportion as it is extended. The term laceration never was more unfortunately applied than to the bladder; for when there is a breach in it, we find upon diſſecting it to be a *ſmall* round hole, ſuch as might be covered with the point of the finger; it is round, like a ſhot hole, with a rough and ragged margin, in ſhort, the rupture is at a ſingle ſpot, not longitudinal, but circular; the bladder, together with all the adjacent viſcera, is red and inflamed, while this ſingle point is black and mortified.

The ſigns of death are not merely ſimilar to thoſe of protracted labour or ſtrangulated hernia, but are eſſentially the ſame, as proceeding from the ſame cauſe. While the bladder is diſtending, the abdomen feels hard and firm, and the tumor is circumſcribed in the hypogaſtric region: when the bladder reaches the ſcrobiculus cordis, the ſymptomatic vomiting comes on, the pulſe becomes rapid, the belly becomes extremely ſenſible, and the patient cannot endure the gentleſt touch: and ſoon, the particular ſwelling of the bladder is concealed, becauſe the abdomen in general becomes tumid and elaſtic, like a drum, while the pulſe becomes frequent and irregular, the mouth is parched, the face ghaſtly, and the extremities cold; and when after a period of inſenſibility or low and muttering delirium, the patient expires, we find, upon diſſection, the bladder deep coloured, of a duſky red, thick and fibrous, or fleſhy: often the bladder has formed adheſions with the ſurrounding parts, and the viſcera of the abdomen are very generally inflamed before actual gangrene comes on, or the bladder gives way, and the patient uſually expires thus, not of rupture of the bladder, but of fever, irritation, and ſuppreſſed diſcharge. But when the bladder has actually yielded, its rupture

is accompanied with a ſenſe of ſomething giving way within, and we find that the opening is in the centre of the fundus, in one round gangrenous ſpot.

To thoſe who imagine that the extenſion of parts in the living body, is like that of the dead, an attenuation or mere dilatation! who expect to find the bladder, upon diſſection, thin and tranſparent! its real condition muſt appear very ſurpriſing. The bladder has not indeed time to grow by an actual depoſition of parts, but it is thickened by the fulneſs and turgeſcence of its veſſels, and by extravaſation into its cellular ſubſtance. I find always the veins extremely turgid, the muſcular faſciculi big, fleſhy-like, apparently injected with blood (as in a preparation where the bladder is injected with ſize, till the ſize is extravaſated among the coats). And while much blood is extravaſated into the cellular ſubſtance of the coats of the bladder, ſome exudes into its cavity, thence the urine is always deep coloured, obviouſly tinged with blood, and the laſt pound of urine drawn off, either by the catheter or trocar, from a diſtended bladder, is as thick and as deep coloured as coffee-grounds, tinges the inſtruments black, and is extremely fœtid. The ſlow and gradual diſtenſion of any living part is invariably accompanied with actual growth or a ſecretion of new parts; ſudden extenſion is accompanied only with a turgeſcence of veſſels, a fullneſs of blood in the part, and an extravaſation into the cellular ſubſtance: Inflamed viſcera have always from this extravaſation, a livid appearance: a ſtrangulated inteſtine, and a diſtended, and conſequently inflamed bladder, reſemble each other in this reſpect, and though ſuch parts ſeem gangrenous, yet, upon macerating them in water, the blood being waſhed out, they reſume their natural complexion.

That theſe ſeveral ſtages of dilatation of the bladder may be exemplified, I ſhall briefly recapitulate the circumſtances of ſuch a caſe: A woman having fallen in labour on Saturday morning, the head of the child deſcended into the pelvis, the preſſure on the urethra prevented any urine being diſcharged, the head deſcended lower and lower, till the ſcalp appeared, on Monday, protruding through the orifice of the vagina. In this ſtate of ſuffering the woman was permitted to remain till Tueſday evening, when ſhe was delivered. During four complete days the pelvis had been ſo occupied by the head of the child, that the urine could not be diſcharged.

The catheter was never introduced, nor did the medical attendants make even the ſlighteſt inquiry into the ſtate of the abdomen: the nurſe, when changing her linens, after delivery, was ſenſible of an unuſual degree of fulneſs, and the patient expreſſed her deſire to paſs her urine, but ſhe lay down, the deſire returned

again at the diſtance of two hours, and then ſhe paſſed about a pint of urine, next day ſhe ſuffered much from pain in the abdomen, with frequent deſire to make water, which ſhe diſcharged in tea-cup-fulls. On Saturday, (the eighth day of her diſtreſs) the phyſician who attended her was again called: her belly was now greatly diſtended, with great torments, difficulty of breathing, and oppreſſion, an intenſe thirſt which ſhe durſt not indulge, fever, furred tongue, and very frequent pulſe: about an hour before his viſit ſhe felt ſomething *within*, *at the navel*, *crack*, with great pain. For thirty hours preceding this ſhe had made no urine, nor did ſhe paſs one drop from that time forward. A few ounces of very fœtid and dark-coloured urine were now drawn off by the catheter, and on the ſecond day after, ſhe died delirious.

The abdomen was found, upon diſſection, univerſally inflamed: the bladder had given way, and the opening was found to be in the centre of the fundus, of a circular form, and with a black and gangrenous margin. Theſe analogies I could not leave unexplained, ſince they are the very grounds of our prognoſtics, and of our practice: Obſtructed urine, hernia, and lingering labour, reſemble each other ſo entirely, that in each caſe the ſame ſigns indicate the ſame danger. In the common fate of the patient thoſe three caſes unhappily agree but too well; DELAY IS THE GREATEST DANGER, and perhaps I have not, in this book, announced a maxim of more importance than this! I intreat the young ſurgeon to beware of delay: I warn him how inſidious the ſigns of danger are, which accompany ſtrangulated hernia: and as for child labour! every one acquainted with practice is conſcious how much more frequently the accoucheur has to lament the loſs of lives from unmeaning delays, than any harm done by the lever or forceps. In ſuppreſſion of urine it is moſt painful to ſee that the needful operation is uſually performed too late, that the patient's reſignation avails him nothing, and that the dexterous operator has no reward for his ſkill and dexterity. In theſe three caſes it requires talents, experience, and a ſpirit of obſervation, to conduct the patient ſafely: to give a fair chance of relief from the powers of the conſtitution, without expoſing the patient to danger, by delay: to decide, in ſhort, whether in a woman in travail, the abdomen be ſo much inflamed and the ſtrength ſo exhauſted as to require the help of the lever? or whether the ſtrength will not be reſtored by a little reſt, and the labour pains revived ſo as to complete the delivery? Whether, in hernia, the gut is ſtrangulated beyond a poſſibility of reduction, and the abdomen ſo affected as to admit of no delay? Whether, in

caſes of retenſion of urine, the abdomen be ſtill uninflamed ſo as to allow time for the good effects of fomentations, poultices, with a variety of trials, to force the paſſage? or whether the danger be not preſſing, requiring the bladder to be relieved at every riſk, either by forcing the catheter violently through every obſtruction, or by piercing it with the trocar? This I am well aſſured of, that there is no mode of operating, no kind of danger equal to that of delay. It were better that the ſurgeon cut into the bladder by any cruel method! better that he cut above the pubis, or made his way by inciſions in the perinæum, after the manner of the lateral lithotomy, than to delay the operation one hour beyond that in which the ſigns of inflamed abdomen manifeſt themſelves; for, after the rudeſt operations, the patient ſometimes ſurvives, but from delay thouſands have been loſt. It is, I believe, the opinion of all good writers, the maxim reſpected in all æras of our ſcience, the fair deduction from all the fatal or proſperous caſes on record, that we ſhould, in retenſion of urine, as in hernia, operate early.

But while I ſpeak thus the language of conviction, and repeat the injunctions of the moſt experienced of our profeſſion, I cannot be without ſome anxiety, leſt the young ſurgeon ſhould be led into raſh meaſures. I know it to be true that few have ſuffered by precipitation, ſuch is the natural averſion from operation and the reluctance of friends! while in my own limited practice I have ſeen many victims to timid meaſures and operation performed too late; yet I am inclined to treſpaſs with one obſervation more, which may ſerve to qualify the opinion I have laid down.

Inflammation of the abdomen is, in theſe ſeveral ſituations the principal danger, yet the whole aſpect of each caſe is not to be aſcribed to this cauſe: the low delirium, trembling pulſe, or even hiccup, do not portend death in diſtended bladder, in hernia, or in lingering labour, ſo abſolutely as in a gangrened limb: Theſe are not always ſigns of internal gangrene, often they manifeſt themſelves while the parts continue ſound: nor does every degree of ſwelling of the belly, vomiting, and faintneſs, infallibly indicate abdominal inflammation: many of the worſt ſigns proceed, in ſome degree, from mere irritation, and the patient's exhauſted ſtate. Thus in women in travail, the irritation of the head of the child and the inceſſant throes of labour; in ſtrangulated hernia, the fixed girded ſtate of the inteſtine, the drawing down of the ſtomach, the perpetual vomiting, and the attempts to reduce the gut, exhauſt the patient to an extreme degree: and in retenſion of urine, the fullneſs of the bladder and ſuppreſſion of the natural diſ-

charge, the toſſing and miſery of the patient, from deſire to paſs urine, and the ineffectual endeavours to introduce the catheter, exhauſt him, and he ſeems in the laſt ſtage of the ſuppreſſion, to lie almoſt in a comatoſe ſtate. In ſhort I have, in the courſe of my practice, obſerved that in all theſe caſes delirium comes on very early, in conſequence of the pain, fever, and want of reſt, for many days and nights. The inference then is plain: that though in ſuch caſes nothing but operation can ſave the patient's life, we never muſt ſo far prejudge the queſtion, as to ſay he is beyond the reach of art! Every ſurgeon of experience muſt have obſerved, that the woman who fainted when ſhe was raiſed into a proper poſture for being delivered, is rouſed by the pain of introducing the inſtruments to ſuch exertions, that her efforts greatly aſſiſt the operation of the lever or forceps: that in hernia the languor, hiccup, and vomiting ceaſe, the moment the ſtricture is relieved, the pulſe riſing to its level, and becoming comparatively firm and ſlow: and that in dangerous diſtenſions of the bladder, the abdominal pain ceaſes, the pulſe ſubſides, the toſſing of the patient, and all the ſigns of indeſcribable uneaſineſs, vaniſh as ſoon as the catheter or trocar are forced into the bladder: after thoſe ſeveral operations, the delirium goes off, the ſenſes become clear, the fever ſubſides, and the natural ſleep is reſtored.

In ſhort, the worſt ſigns are no ſure proofs of gangrene; the patient is perhaps exhauſted with ſickneſs, irritation, and pain; we never muſt prejudge the queſtion, ſaying, "It is ſurely too late to operate!" IN THE MOST HOPELESS CASES, LET THE PATIENT HAVE HIS CHANCE FOR LIFE.

And now that I am to analyſe the ſeveral operations, and teach that which is fitteſt in the ſeveral circumſtances to be performed; I ſhall ſay a few words on a ſubject of ſome delicacy: The talent of operating is not merely uſeful, as enabling the ſurgeon to perform ſafely, a diſſection which is not without danger, but ſtill more in giving him perfect poſſeſſion of his own mind. The degree of ſkill we have or ſuppoſe ourſelves to have, in operating, enters, I fear, too much into our feelings, when conſidering what is beſt to be done; for, in difficult circumſtances, a man timid and unſkilful in operation will be apt to linger and heſitate, a man bold and conſcious of operating, well, eſpecially if not familiar with practice, will be apt to hurry on with precipitation, to the moſt decided meaſures; but a man who is familiar with ſcenes of this nature, and has both performed many operations, and has ſtudied well the prognoſtics of danger or ſafety; will, if he be at the ſame time a fearleſs operator, proceed at once with reſolution and caution,

will neither hurry, nor delay too long, the meaſures which he thinks neceſſary for the patient's ſafety, and though no modeſt nor ingenuous man will ever, upon a retroſpect, be entirely ſatisfied with his own conduct, even when moſt ſucceſsful, yet one thus qualified at once to reflect deliberately, and act intrepidly, will, upon the ſevereſt ſcrutiny into his paſt conduct, find little reaſon for ſelf-reproach. I do regard ſkill in operating as of the utmoſt importance in giving the ſurgeon perfect ſelf-poſſeſſion: a bad operator will heſitate, in the moſt ſimple caſes, while a good and dexterous operator, like a man ſkilfull in the uſe of weapons, will not enter raſhly into difficulties, but being engaged from conviction, will bring himſelf through with courage. Let every young man then endeavour to become a DEXTROUS OPERATOR, for that will help to make him a JUDICIOUS SURGEON.

HISTORICAL REVIEW OF THE SEVERAL METHODS OF PUNCTURING THE BLADDER.

If we are entitled in any caſe to join pathology with ſurgery, to reaſon from the conſtitution and nature of the parts, and from the acknowledged dangers of operation, to any practical concluſions, it muſt be in the preſent caſe, where innumerable diſſections inſtruct us in the cauſes of death. Having eſtabliſhed this leading fact, that in caſes of protracted labour, of hernia, of obſtructed urine, of retroverſio uteri, (where alſo the diſtenſion of the bladder is the chief danger) the patient dies from no other cauſe than inflammation of the abdomen, let us ſee what aſſiſtance this theory will give in deciding the main queſtion, "Which is the leaſt dangerous method of tapping the bladder?" Firſt, If we make our inciſion above the pubis, and ſtrike the trocar from that point into the bladder, we cut parts contiguous with the peritonæum already inflamed. Secondly, If we cut from the perinæum, with inciſions reſembling thoſe of lithotomy, we make deep, unneceſſary wounds in a part of the bladder which, though lodged in the pelvis, ſometimes extends its inflammation, as in Cheſſelden's firſt experiments, to the cavity of the abdomen. Thirdly, If we ſtrike the trocar ſkilfully into the ſame part into the perinæum, without ſuch preliminary inciſions, the riſk of inflammation is greatly leſſened; and if we paſs the trocar from the rectum into the bladder,

we carry it through no thickneſs of parts, but transfix only two membranes: it is "like a ſtroke in the water": and the danger of inflammation is exceedingly ſmall. This ſlight index of the principles, according to which I mean to reaſon, will enable my reader to accompany me in the following critical review of the ſeveral methods of operating: perhaps it will enable him to anticipate many of my concluſions, it will ſurely incline him to adopt a mode of puncturing the bladder very different from that in common uſe.

FIRST METHOD.

The moſt common operation, becauſe the moſt obvious, is to penetrate from above the pubis. Every ignorant tyro, though unable to ſtrike the bladder from any other part, is able to plunge the trocar into it, at a point where he feels the fluctuation ſo plainly: that ſuperficial objection of the danger of wounding the peritonæum, ſo often urged againſt this method, is indeed of no importance; there is no danger of wounding the peritonæum, for the bladder when greatly diſtended, reaches high above the navel, carries the peritonæum, of courſe, before it, and expoſes a ſpace of ſeveral inches, in which we may perform our inciſions without incurring this kind of danger. But the abdomen is inflamed; the preliminary inciſions, which prepare for the introduction of the trocar, paſs, in a groſs old man, through ſeveral inches of fat and cellular ſubſtance: the inciſions muſt be wide in proportion to their depth: the canula is no ſooner lodged here than it is diſplaced, in ſome degree, by the contraction of the bladder, which, when emptied, ſubſides under the pubis: The canula ſtands ſo obliquely that the urine never flows with eaſe but by running out upon the wound, and by being injected among the cellular ſubſtance, it cauſes the wound to inflame, the wound by its proximity to the inflamed peritonæum ſoon mortifies, and thus notwithſtanding the temporary relief produced by the emptying of the bladder, the patient dies on the third or fourth day.

Thoſe who have been forced by fatal experience, to condemn the puncture above the pubis, have entered into no inveſtigation, and have not always been able to aſſign a cauſe for their ill ſucceſs; but it is well known that the wound is apt to grangrene, the operation is ſo eaſy that nothing but experience of its ill conſequences could prevent its being univerſally preferred; but the unfavourable iſſue of the operation is now ſo univerſally acknowledged, that even the difficult and deep inciſions in the perinæum are preferred.

SECOND METHOD.

To perforate the bladder with a trocar, from the perinæum, after making incifions, like thofe of lithotomy, is the fole method now mentioned in fyftems of furgery; a harfh, cruel, and dangerous operation, which is indeed founded on one ftill more atrocious, viz. driving the gorget through the neck of the bladder, as in the operation of lithotomy. This latter operation had fallen into utter contempt at the time when Sharp wrote his Critical Inquiry, and how any thing fo nearly refembling this cruelty, as the modern operation by incifions in the perinæum could be thought of is to me a matter of furprife. " Befides thefe methods (fays Sharp), of drawing off the urine when under fuppreffion, they have alfo *made way for the reception of a canula by cutting open all the urethra from that part of the perinæum where cutting is performed by the greater aparatus*, and continuing the incifion through the neck of the bladder; this they have done by the help of a grooved ftaff, when it was practicable, and, where ftrictures of the urethra prevented the introduction of a ftaff, they have either cut, according to the beft of their judgment, without any guide, or have pufhed in a trocar with a grooved canula, and cut upon the groove; when the incifion was made they paffed a gorget, and, by that means a filver canula, round which they twifted fome fine rag, that it might lie eafier in the wound *." " This is indeed making furgical work, and puncturing the bladder after the manner of lithotomy up to the very letter of the text; yet I know not how to diftinguifh this from the operation now in common ufe."— " With *a view* to puncture the bladder from the perinæum the patient *ought* to be laid upon his back, and his thighs being properly feparated and fecured by affiftants, an incifion *fhould* be made of about an inch and a half in length *beginning at the commencement of the membraneous part of the urethra*, and continuing it *towards the anus* in a line parallel with, but at leaft half an inch diftant from, the rapha perinæi; in this manner the fkin and cellular fubftance *ought* to be *freely* divided, which *puts it* in the power of the operator not only to introduce the trocar with more eafe, but to avoid the urethra with more certainty than he *otherwife could do*. *This being done*, as the bladder is always much diftended when this operation is neceffary, it will be very eafy diftinguifhed by *preffure at the bottom of the wound:* but whether it fhould be felt by the finger or not, there need be no

* Critical Inquiry, page 124.

hesitation in pushing in the trocar a little *above* and to the left of the prostate gland, which, if the parts have been freely divided, may be always discovered; and if the point of the instrument be carried a very little upwards, there can be no danger of wounding either the ureters or vasa deferentia, which some have been afraid of in this operation, and at the same time there must be an *absolute certainty*, if the trocar is carried deep enough, of its reaching the bladder."

Nothing can explain such a blunder as this, but the history of the operation, which will prove, that at one time such incisions had a meaning, though now they have none. This operation was originally performed in a manner which no good surgeon would imitate, and for motives which no modern surgeon would avow. Dionis claims, in the following passage, the honour of inventing this operation for which the lithotomy of Frere Jaques had prepared the way, the theory of the two operations being expresly the same: "The method which Frere Jaques has taught us, (says Dionis) has put it in my head, that we may, with greater security, perform the puncture of the bladder in that point, where he makes his incision for extracting the stone; viz. in the body of the bladder itself, near the neck, so as to save the necessity of running the knife all the way along the urethra, for if we strike in the scalpel, an inch from the perinæum, and pierce the body of the bladder near its cervix, we have reason to believe that the operation will be both more certain and less painful, since neither the urethra is opened, nor the cervix vesicæ injured; and the inflammation once gone, the urine, upon removing the canula, will pass easily by the natural channel *." "This (says Dionis) we may truly call a cystotomy, since we actually strike the *body* of the bladder."

* "Voilà la maniere dont on s'est servi jusqu'à présent pour faire la ponction au périnée, mais celle que nous a apporté Frere Jacques pour tirer la pierre de la vessie, et dont je vous ferai l'histoire tantôt, *m'a donné occasion de penser qu'on pourroit faire plus sûrement cette ponction à l'endroit de la vessie où il fait l'incision pour le calcul, c'est-à dire dans le corps même de cet organe proche son col*; desorte qu'il ne faut pas plonger le scalpel dans l'uretre & le faire passer par le col de la vessie, qui dans une inflammation est tellement tumefié que rien n'en peut sortir, et qu'on est en danger d'entamer ce col avec l'instrument pour lui faire un passage, ce qui peut redoubler les accidens et frustrer le malade du fruit qu'il attend de l'opération: mais si on enfonçoit l'instrument à un doigt du périnée, et qu'on perçât la vessie dans son corps près de son col, je crois que l'opération en seroit plus sûre et moins douloureuse; *puisqu' on ne perceroit point l'uretre, qu'on n'offenseroit point le col de la vessie, et que l'inflammation diminuée ou passée, l'urine sortiroit par son chemin ordinaire* en ôtant la canule, et fermant la plaie qu'on panseroit à la maniere accoutumée, et qui se guériroit aussi facilement que les autres; car on sçait à présent que les plaies de la vessie ne sont pas mortelles comme on le croyoit autrefois, pourvû qu'elles ne soient pas d'une grande étenduë, et que quelque membrane voisine se puisse coller contr'elles. Cette opération se doit appeller Kistitomie, parce qu'effectivement on ouvre le sac urinaire."

Superficial men writing upon this point ſay, "that the paracenteſis of the bladder is to be performed like the operation of lithotomy!" like what lithotomy they know not! they have no deſign of preſcribing for this ſimple operation theſe horrible inciſions! they have no apprehenſion that it is the lithotomy of Frere Jaques, they have to deſcribe! they have no ſuſpicion of having travelled backwards two hundred years in the ſcience, and aſſimilated the uncouth operations of antique quackery with modern ſurgery. They have no apprehenſion that the paracenteſis veſicæ was ſo performed, with no better deſign than that of ſtriking the body of the bladder behind the gland, leaving the cervix veſicæ entire; nor that it was ſo performed that the urine might flow more eaſily, neither did they ever reflect that by ſtudying the anatomy of the parts, this ſame paracenteſis veſicæ might be performed with the ſimple trocar, with as perfect ſecurity and almoſt as little danger as paracenteſis abdominis.

Is all this butchery neceſſary? Is a man entitled in any degree to the appellation of ſurgeon, who needs to make inciſions like thoſe of lithotomy, before he can diſcover where the urinary bladder lies? is it neceſſary that the ſurgeon not only diſtinguiſh the bladder, but feel the fluctuation of the urine, before he dare introduce his trocar? The conſequences of ſuch inciſions I can report but too truly, for I have hardly ſeen any other performed: the effects are nothing ſhort of thoſe performed in lithotomy, the danger indeed is greater, nothing is wanting to make it more cruel, but the actual pulling out of a ſtone with the forceps, but, the fever, abdominal inflammation, and obſtructed diſcharge, form, in the preſent caſe, an aweful counterbalance, to this pulling out of the ſtone with forceps; for that violence is practiſed only in a healthy patient, and in ſound parts, whereas theſe inciſions for the paracenteſis, are practiſed only in diſtended bladder and inflamed abdomen! the inflammation of the abdomen is not arreſted by merely emptying the bladder, the parts on the contrary, fall into gangrene, and the patient dies.

We thus find that the excellency of this method was ſuppoſed to conſiſt in ſtriking the bladder in its body, leaving the neck entire; an excellency which no good ſurgeon will acknowledge, ſince it implies an oblique and dangerous wound, quite unlike that which he makes in performing the lateral operation. But the operation is not only eſſentially bad, but extremely difficult to perform. The young ſurgeon, when preparing to operate, turns up his ſyſtem of ſurgery, reads the chapter on paracenteſis, and ſays to himſelf, in the words of the author, "I will perform it in the ſame manner as lithotomy is performed;"

how unlike the two operations are, he never is aware, till he is engaged in a diſſection which he cannot complete. There is no ſtaff in the bladder to guide his inciſions, which, even in lithotomy, are not always performed with confidence: he, after deep and irregular inciſions in the perinæum, ſtrikes in his trocar at random, and miſſes the bladder, or transfixes it, or buries the point of it in the enlarged proſtate, or cuts the urethra away from the gland: Theſe are not hypothetical ſtatements of poſſible blunders; I have witneſſed theſe accidents, and drawn the plans which I now preſent to my reader, in the moment of the operation, or in the time of diſſecting the body.

There is no more heinous fault than that of practiſing ſurgery without a knowledge of anatomy, unleſs it be that of ſtudying anatomy independently of pathology, and applying the deſcriptions of parts in the ſound body, to the ſame parts in a ſtate of diſeaſe. The effect of the enlargement of the proſtate gland, upon our operations, has (as I know by fatal examples) been but little ſtudied. The plan 1ſt, of enlarged proſtate is very ſimple, I have repreſented in a true drawing the enlarged proſtate which in truth fills all the lower part of the pelvis, and preſents itſelf to the ſurgeon, ſo that without a perfect conception of its form, and actually feeling it with the finger, he can perform no operation without blundering. The extent of the enlarged gland is deſignated by the figures (a a a); the contracted bladder (for it thickens and corrugates in proportion as the gland grows) is marked (b b); the membranous part of the urethra is marked (c); while the original and natural ſize of the proſtate is marked in dotted lines; and let it be obſerved that as the gland enlarges, the ſpace (d) betwixt the ureters and veſiculæ ſeminales of the two ſides, is increaſed; by being removed from each other, they leave a wider ſpace open to the puncture of the trocar, ſo that they cannot be wounded, and though it were not ſo, the wounding of the veſiculæ, though it has been repreſented as a mighty objection to the puncture from the rectum, is none: the veſiculæ would heal as eaſily as any other part, and the ureters would reunite (unleſs indeed they were cut acroſs), as eaſily as the bladder reunites, but this is a queſtion of no importance, the operation is performed in people advanced in years and ruined in conſtitution, and the queſtion is not about ſaving the organs of procreation from any ſlight injury, but about ſaving life.

The plan 2d, preſents the ſame parts in a vertical ſection. The ſtaff is ſtopped at (a), in the membranous part of the urethra, by a ſtricture. The gland (b b) is repreſented as enlarged, filling the lower and fore-part of the pelvis, and

compreſſing, in ſome degree, the rectum. By the help of this plan I ſhall deſcribe certain errors which I have ſeen repeatedly committed, and which I hold it particularly important for the young ſurgeon to be acquainted with: When the ſurgeon *is to make "incifions in the perinæum, an inch and a half in length, at the commencement of the membranous part of the urethra, and continuing it towards the anus in a line parallel with, but at leaſt half an inch diſtant from the rapha perinæi!"* he has to operate according to precepts ſo inconſiſtent with the actual relations of the parts, ſo unintelligible to one who is an anatomiſt, and ſo nugatory to one who is not, that he muſt cut at random: having made deep inciſions in the perinæum, he no ſooner begins "to ſearch for the bladder with his finger in the bottom of the wound," than he directly encounters the enlarged body of the proſtate: If he underſtands what he feels and diſſects backwards till he diſtinguiſhes the bladder itſelf, he actually reaches that part of the bladder which lies upon the rectum; (viz. the ſpace betwixt the veſiculæ) he arrives exactly at the ſame point which he touches in perforating from the rectum, and no one will deny that he might perforate with more ſecurity and leſs pain from the rectum, through its thin walls, than from the perinæum by theſe inciſions: But, having made his way to the gland, he points his trocar (which is uſually too ſhort for any purpoſe, and not at all appropriated for this) directly upon the gland, drives it deep into its ſubſtance, and no urine flows, or flows only when both trocar and canula are withdrawn.—How this happens it is not difficult to conceive: "An old man who, for the laſt twelve or fourteen years of his life, was ſubject to occaſional difficulty, was at laſt affected with entire ſuppreſſion, ſo that for five days preceding the operation, he had not paſſed one drop of urine: all attempts to introduce the catheter, or give relief by paſſing bougies, were in vain, the tumid bladder was felt above the navel, he had continual ſtraining to void his urine, with ſickneſs, thirſt, and a feveriſh pulſe. But in his diſeaſe, nor in his preſent diſtreſs, there was nothing peculiar nor worthy of notice. A young ſurgeon performed the operation of puncture in perinæo by all the uſually preſcribed rules. After diſſecting into the hollow of the pelvis, he ſtruck his trocar deep, but upon withdrawing the ſtillet, no urine flowed, it was only when he was withdrawing the trocar alſo, that a little urine run out; nothing intimidated by this ill ſucceſs, he ſtruck his trocar once more, now the urine flowed freely; the canula was left in its place, the urine continued to be diſcharged, but the abdomen inflamed and the man died."

"Upon diſſecting the body, the firſt thing that could be obſerved was the

ſundus of the bladder hanging flaccid upon the point of the canula, which projected ſome inches into its cavity; upon opening the bladder, the canula was ſeen in its place; upon withdrawing the canula and cutting out the parts from the pelvis, laying them on the diſſecting board, and inveſtigating the inner ſurface of the bladder, not the ſlighteſt mark of puncture was to be found; ſo that had not the trocar been ſeen in its place, upon opening the abdomen, no one could have believed that it had penetrated!"

This caſe I noted down as peculiarly inſtructive; an operation eſſentially bad was performed in a manner ſo rude and barbarous, that a coroner's inqueſt might have taken cognizance of the affair: This culpable homicide was a conſequence of the ſame ignorance of anatomy, which makes many an operation for the ſtone miſcarry: There is no wonder if a ſurgeon who would, if he were cutting for the ſtone, nick the urethra ſeveral times before he was ſure of having divided it, ſtrikes his trocar twice before he punctures the bladder: This gentleman directly encountered the diſeaſed proſtate without knowing it! He not only plunged into its ſubſtance, but that tranſverſely, ſo as to transfix the gland in the direction of the dotted line (c); for the point of his canula being buried in the farther ſide of the gland, no urine flowed when he firſt withdrew the ſtillet! but while he was withdrawing the canula, after he had drawn its point from the farther lobe of the gland, and before it was withdrawn altogether, it received, in paſſing from ſide to ſide, a few drops of urine which flowed out: The ſecond time he ſtruck in his trocar, it neither paſſed deep behind the gland, which is the proper intention in this method, nor into the ſubſtance of the gland, and through its thickneſs into the cavity of the bladder, as uſually happens, but directly onwards in the line of the natural canal, in the direction (c), firſt through the urethra, and then through the centre of the gland. Thus it happened, that, after death, no wound of the trocar could any where be found; as for the death of the patient there cannot be a matter of wonder.

That the ſurgeon can hardly perforate behind the diſeaſed gland through the body of the bladder itſelf, except by a very deep and dangerous diſſection, is what I have always conjectured, when obſerving the ſize of the diſeaſed gland, every operation I have ſince witneſſed has contributed to ſtrengthen a ſuſpicion, which has been abſolutely confirmed by a miſcarriage more extraordinary and leſs pardonable than that which I have juſt mentioned; for though it is unpardonable to begin the operation by inciſions in the perinæum, without introducing the finger

in ano, to feel the condition and ſize of the gland, yet nothing can exceed the folly of actually perforating from the rectum, of having the finger introduced for the purpoſe too of guiding the trocar, without eſtimating the extent of the gland, or chooſing a trocar ſufficiently long.

A gentleman being reſolved to practiſe the neweſt piece of ſurgery; viz. puncturing from the rectum; uſed, in ſpite of every remonſtrance on my part, a common trocar, hardly more than three inches long! a common trocar for tapping the belly in aſcites! The conſequence was moſt lamentable, for the inſtrument being buried in the ſubſtance of the enlarged gland (as is repreſented by the trocar, marked (f), figure 2d), not one drop of urine flowed; the trocar and canula were both withdrawn, and the operation of puncturing above the pubis performed.

If men will ſo neglect anatomy as to miſs the membranous part of the urethra, in cutting for the ſtone, although guided by the ſtaff! if a ſurgeon be ſo ignorant of the proportion of parts, as to take a common ſhort trocar in his hand, with the deſign of perforating the bladder from the rectum! is there any wonder, that ſuch uneducated or unthinking men, miſs their ſtroke? It is not I declare, for the purpoſe of decrying an operation itſelf good, that I betake myſelf to this moſt inſidious of all arguments, the argumentum ad hominem: I regard this as a bad operation, even though performed by a John Hunter, a Lynn, or Earle; and it is my duty to warn thoſe who will perform it, that it is an operation differing in every reſpect from that of lithotomy, and infinitely more dangerous. While the bladder is ſo eaſily acceſſible to a good ſurgeon and anatomiſt, at various points, let us hear no more of performing the paracenteſis veſicæ, like the lateral lithotomy with deep inciſions. Surgeons ſeem univerſally to have adopted the bloody ſentiments of Dionis, who, when he found the catheter could not paſs, grew quite deſperate, exclaiming in the homely language of his time, "Nothing can now ſave but a puncture from the perinæum, he muſt piſs or die." "Parce qu'il faut qu'il piſſe, ou qu'il meure."

THIRD METHOD.

We find then that this doctrine of ſtriking the body of the bladder behind the gland, had continued through ages, and had its influence on more than one operation; but theſe preliminary inciſions in the perinæum, were never thought of by any ſurgeon till the ſtudy of anatomy began to decline. Collot, and Dionis, and Mareſchal, and La Faye, knew well how to ſtrike the trocar into

the bladder, without diſſecting for it, or feeling it with the finger "in the bottom of the wound"; it was at firſt the univerſal practice to ſtrike a long and ſlender knife from the perinæum into the bladder, when the catheter could not paſs; next a trocar was ſubſtituted for the knife; and finally this proceſs was improved into an operation highly deſerving of notice.

Enmity brings to light many ſecrets. Collot, the irreconcileable enemy of Frere Jaques, explains to us, "that for a long courſe of years it had been the practice of the French ſurgeons, whenever inſuperable obſtructions in the urethra prevented the introduction of the catheter, to take a ſlender and dagger-ſhaped knife, and ſtrike it at random from the fleſhy point of the hip upwards, along the ſide of the rectum, towards the bladder, which being diſtended with urine, met the ſtroke, and the urine was thus diſcharged, but with very ſmall hopes for the life of the patient."—"Sometimes (he adds) ſuch patient having a ſtone, the operator was naturally induced to hook it out with his fingers, or introduce forceps *;" and to this ordinary reſource of the ſurgeon, in caſes of ſuppreſſion of urine, does he refer, and perhaps fairly, that operation of Frere Jaques which he affected to have learnt by inſpiration.

Secondly, This rude operation was neither diſuſed nor yet improved in the time of Dionis, who directs the ſurgeon, "after placing his patient as for the operation of lithotomy, the legs bended, the knees ſeparated, and the aſſiſtants holding the patient firm, to take an inſtrument forged on purpoſe, ſhaped like a ſcalpell, ſtraight pointed, and from four to five inches long, and plunge it into the bladder, from that part of the perinæum by the ſide of the rapha, where the inciſion of lithotomy is made, the ſurgeon being ſenſible of having pierced the bladder by the flowing of the urine; but before withdrawing the knife, with the right hand, he muſt ſlip in a probe along it with the left, and thus provide the means of introducing a ſilver canula, which is to remain in the bladder till the obſtruction be relieved †."

* "Il eſt arrivé quelquefois que le chirurgien arrêté par les obſtructions faites dans le canal, ne pouvoit paſſer ſa ſonde pour tirer les urines retenuës, il ſe ſervoit d'un petit inſtrument en *façon de poignard, et il faiſoit* une ouverture au hazard et ſans regle au bas de la feſſe dans *l'endroit le plus charnu*, il couloit le poignard le long du rectum, et il alloit percer *le corps de la veſſie*, laquelle étant pleine d'urine, favoriſoit l'operateur, ces urines ramaſſées, s'échapoient, les malades ſe trouvoient ſoulagez à la verité, mais toûjours avec peu d'eſperance de vivre. "Parmi ces ſortes de malades il s'en rencontroit qui avoient une pierre." COLOT, p. 23.

† "Il ne faut pas néanmois laiſſer périr un malade, et il n'y a qu'une ponction au périnée qui puiſſe lui ſauver la vie, parce qu'il faut qu'il piſſe ou qu'il meure; c'eſt au Chirurgien à en avertir les parens ou les amis

The operation repreſented by Dennis, and no doubt practiſed in Holland, was preciſely the ſame with that which I have juſt deſcribed, but that practiſed by Raw was more refined, he uſed not long, dagger-like biſtouries, ſuch as Dionis deſcribes, but the common trocar. "I have known him (ſays Dionis) give relief by ſtriking into the bladder at the ſame point where he cut in his operation for the ſtone, a common triangular trocar ſuch as is uſed in hydrocele, but bigger and larger *."

Fourthly, If Frere Jaques, in the invention of his peculiar manner of cutting for the ſtone, followed the analogy of that puncture of the perinæum, which was performed by ſtriking in a dagger-ſhaped biſtoury; Foubert, in the invention of his operation for the ſtone, took the analogy of this improved puncture with the trocar. He made the puncture with the trocar, (as I have already related) the firſt ſtroke in his operation, and he made a groove in the ſide of his canula, to ſerve as the conductor or ſtaff along which his lithotome or inciſion knife was run home into the bladder. What degree of praiſe we ſhould aſſign to his invention, it is hard to ſay, but it is gratifying to trace the links by which every ſucceſſive invention is connected: each of theſe daring inciſions or ſtabs rather, (made with the pointed biſtoury, piercing from the hip to the bladder,) ſerves to give us confidence in ſtriking the trocar from the perinæum through the centre of that triangle of which the tranſverſe muſcle forms the baſe; and the whole hiſtory of theſe

du malade, et à leur faire le prognoſtic tel que le demande la nature de la maladie. Ayant enſuit diſpoſé l'appareil, il faudra ſituer le malade ſur le bord du lit et le coucher à la renverſe les deux cuiſſes écartées et es jambes ployées de maniere que les talons touchent les feſſes, faiſant tenir les jambes en cet état par deux ſerviteurs, et par un autre lever le ſcrotum en haut: *puis l'opérateur prendra un inſtrument fait exprès en* FORME DE SCALPEL, étroit, pointu, et long de quatre ou cinq pouces, tel qu'il eſt marqué par E. *Il le plongera droit dans la veſſie*, en commençant la ponction à côté du raphé, au même endroit où ſe fait l'inciſion dans la lithotomie, et il connoîtra qu'il eſt dans la veſſie par l'urine qui ſortira à côté de l'inſtrument; mais il faut avant que de le retirer, couler une ſonde droite F. à côté du biſtoury juſques dans la veſſie. Cette ſonde ſe conduit de la main gauche, et l'inſtrument ſe retire de la main droite, dont on prend enſuite une canule d'argent G. longue de quatre pouces, qui a deux anneaux à ſa tête, dans leſquels ſera paſſé un ruban H." DIONIS, p. 196.

* "Collocantur eodem modo ægri, ac ſi lithotomiam inſtitueremus; lanceola chirurgica ad latus perinæi aperturam facimus uſque in veſicam eodem loco, ubi magno adparatu calculum veſicâ extrahimus. Quam primum urina nobis obvia fit, certi ſumus nos veſicam penetraſſe. Tunc juxta inciſorium rectam fiſtulam in veſicam intrudimus, dein argenteam fiſtulam per quam ægri urinam evacuamus.

"Novi celeberrimum Rau tali in caſu per fiſtulam, in qua triangulariter acuta cuſpis continebatur, ſimilem inſtrumento, quo aqua ſcroto evacuatur, Gallice Troiſcar dicto, ſed longiorem et craſſiorem urinæ viam paraſſe, hancque eundem in veſicam intruſiſſe, ubi lithotomiam ſolebat inſtituere." DENNIS's Ob. Chirurg. De Calculo, p. 141.

operations ſerves as a code of rules explaining to us what it is poſſible to do even by a rude inciſion, what it is eaſy and ſafe to do by a well regulated puncture; ſuch I account Mr. Foubert's, he had not the ſame deſign with Collot, Dionis, and Raw, of ſtriking the bladder behind the gland, he did not attempt to ſtrike his trocar in that direction in which they guided their knife, along the ſide of the rectum; he entered his point higher in the perinæum, nearer the root of the penis, cloſer to the arch of the perinæum, and aimed at the fore part of the bladder above, and a little to one ſide of the gland. Foubert's method is as diſtinct from that of Raw, as the puncture above the pubis, from the puncture in perinæo. That Foubert ſometimes miſſed the bladder is not to be denied, but it was in cutting for the ſtone in a contracted bladder, which could not perhaps at any time have contained half a pound of urine, and at the moment of the puncture, no more perhaps than two ounces.

How different this from the ſtate of the bladder in ſuppreſſion, when its fundus reaches to the navel, and its broader and lower part occupies all the pelvis. The puncture is performed on the broadeſt part of the bladder, where it lies under the arch of the pubis; the point of the trocar enters about the level of the urethra, where there is little of the diſeaſed gland; to hit the bladder, not from behind the gland, but from its fore part thus, is as eaſy as to plunge into its fundus from above the pubis: no tyro could miſs the ſtroke: if the ſurgeon keep cloſe to the arch of the pubis, without actually encountering the bone with his trocar, he cannot fail to ſtrike the bladder fair.

For this operation the patient is to be laid as for lithotomy, on the ſide of his bed, on his back, the knees raiſed and ſeparated by aſſiſtants, and the heels placed firm upon the bed, near the buttocks, or held by the aſſiſtants on each ſide; a ſkilful aſſiſtant is to compreſs the abdomen with both hands, ſo as to depreſs the bladder and keep it ſteady.

The ſurgeon is to imagine a line drawn in the direction of the tranſverſe muſcle; i. e. from the anus to the tuber iſchii, and the centre of the triangle which that line forms with the arch of the pubis, or a little higher than the centre, is the point at which the trocar is to enter.

The catheter is to be introduced as far as it will paſs, to prevent any harm to the urethra, and to direct the trocar; the forefinger of the left hand is to be paſſed deep into the rectum, to feel the bladder or the ſwelled gland, and to enable the ſurgeon both to judge of the relation of parts, and to keep them in ſome degree

ſteady; the trocar, which muſt be long, ſlender, and a little curved, muſt have a big, round handle, and the ſurgeon taking the handle in the palm of his right hand, and laying the fore-finger along the canula to ſteady it, is to enter it, at firſt, directly into the part inclining a very little upwards, and to carry it on ſlowly, ſteadily, and without fear, until he feel it in the open cavity of the bladder, when, by withdrawing the trocar, the urine will flow out.

"The operation of paracenteſis, though it be no more (ſays Dionis) than a ſimple puncture, requires on the part of the ſurgeon, a perfect knowledge of anatomy, and of the relation of parts, both to conduct his inſtrument directly into the bladder, and to avoid encountering any important parts; it is indeed alarming to a ſurgeon little verſed in anatomy, though extremely eaſy to thoſe who are *." To this opinion we very willingly ſubſcribe; if the operation be at all perplexing, it muſt be to thoſe only who are ignorant of anatomy, but I have gone a ſtep farther in proteſting that it can be difficult to no one who has diſcretion and courage; and that it is as eaſy to ſtrike the broad anterior ſurface of the bladder under the arch of the pubis, as to plunge into it from above.

FOURTH METHOD.

It will appear from theſe hiſtorical ſketches, that each operator, in puncturing the bladder, either actually operated as in cutting for the ſtone, or followed at leaſt the analogy of his own favourite lithotomy, or that of the age in which he lived. Before the times of Frere Jaques and Dionis, a method was practiſed by La Faye, Morand, Petit, Mareſchal, and the other lithotomiſts of Paris, allied with the apparatus major, an operation which, though very fatal, when practiſed for the extraction of a large ſtone, or indeed of any ſtone, is excellently adapted for emptying the diſtended bladder. When theſe ſurgeons deſigned to tap the urinary bladder, they proceeded in one of two ways; either they preſſed the ſtaff home into the bladder, and cut, as in lithotomy, running in their blunt gorgets upon the ſtaff: or, being unable on account of the obſtruction to paſs the ſtaff into the bladder,

* "Cette operation quoiqu'elle ne conſiſte que dans une ſimple ponction, demande qu'un chirurgien ſçache par l'anatomie la diſpoſition des lieux où il la fait, tant pour conduire ſon ſcalpel droit dans la veſſie, que pour connoître quelles ſont les parties que ſon inſtrument peut offenſer en chemin faiſant; il faut auſſi qu'il l'ait vû faire pluſieurs fois avant que de l'entreprendre, car elle effraye un chirurgien qui n'eſt pas fort verſé dans l'anatomie, ou qui n'a jamais vû faire cette ponction: mais ceux qui en poſſedent la pratique la trouvent une des plus faciles de la chirurgie." DIONIS, p. 179.

they ſtruck in the trocar at random, aiming at the urethra, and entering the point of the trocar where the ſtaff was intercepted by the obſtruction.

No detail which relates to operations, ſo important and critical, can be too particular. " For the operation of paracenteſis, the patient (ſays La Faye) is to be laid upon his back, as for the operation of lithotomy, and a ſtaff introduced if poſſible, into the bladder, and always as low at leaſt in the urethra as the obſtruction will allow: Then the ſcrotum being held up by an aſſiſtant, an inciſion is made with a lithotome, cloſe by the rapha, upon the groove of the ſtaff, and then the operation proceeds, as in cutting for the ſtone; but ſhould the ſtaff not have paſſed into the bladder, the operation is extremely difficult, and it becomes *the ſurgeon, when no longer directed by the ſtaff, to reflect well on the poſition and ſtructure of the parts:* and ſhould he be unable, after his outward inciſions, to open the urethra with his lithotome (or inciſion knife), *let him enter a ſlit trocar into the urethra, and then, by running his biſtouri along the ſlit, he will be able,* upon withdrawing the canula, to make an inciſion into *the neck of the bladder.* Petit and Morand have performed this operation with ſucceſs."

" The inciſion being made, a gorget is firſt paſſed into the bladder; the iſſue of the urine proves that it has entered, and then the gorget being held ſteady with one hand, with the other a canula, wrapped round with linen rag, is paſſed along the gorget into the cavity of the bladder *."

* " Le malade eſt ſitué de la même maniere que pour l'operation de la taille au grand appareil. On introduit une ſon de canelée dans la veſſie, ſi on le peut, ou du moins auſſi avant dans l'uretre qu'il eſt poſſible, pour ſervir de guide. Les bourſes levées par un aide, on inciſe avec un lithotome ordinaire à côté du rapé et ſur la canelure de la ſonde, ſi elle eſt aſſez avancée, et l'on ſe conduit comme dans l'opération de la taille. Si l'on ne peut faire l'inciſion ſur la ſonde, cette opération eſt beaucoup plus difficile; le chirurgien obligé de travailler ſans ce guide, doit ſe bien repreſenter la ſtructure et la poſition des parties ſur leſquelles il opere. Si après avoir fait l'inciſion aux tégumens, il ne peut parvenir à ouvrir l'uretre, il y introduit un trocar dont la canule eſt fendue; et à la faveur de ſa fente, il porte un biſtouri pour faire une inciſion à cette partie, après avoir ôté le trocar. MM. Petit et Morand ont pratiqué cette méthode avec ſuccès.

" Lorſqu'on ne peut introduire la ſonde aſſez avant dans l'uretre pour ſervir de guide, on peut alors porter à l'endroit où finit l'inciſion de la taille laterale, un trocar avec ſa canule fendue, et gliſſer le long de cette fente qui ſert de canelure, la pointe d'un biſtouri, pour faire une inciſion ſuffiſante.

" On fait l'inciſion au milieu des duretez, on emporte celles qui ſont exterieures en coupant le moins de chair que l'on peut. On comprend dans l'inciſion la fiſtule, les calloſitez qui l'accompagnent, et même la glande proſtate, ſi elle eſt dure et ſchirreuſe, et s'il eſt poſſible d'y atteindre.

" L'inciſion faite, on introduit dans la veſſie un gorgeret; la ſortie de l'urine prove qu'il eſt entré. On dégage la ſonde et on la retire; puis tenant d'une main le gorgeret, on conduit à ſa faveur de l'autre main juſques dans la veſſie, une canule garnie d'une petite bandelette de linge. On retire enſuite le gorgeret, et l'on fait porter le malade dans ſon lit, après avoir appliqué une compreſſe ſur la plaie." De La Faye, page 212.

My reader will not all at once conceive why, after the trocar is introduced, a knife ſhould be run in along the groove, and will ſay within himſelf, "Surely when either the ſtaff or the canula had paſſed into the bladder the purpoſe of the operation muſt have been accompliſhed? Why then make needleſs inciſions into the neck of the bladder?" But let it be remembered that theſe were in all ages extraordinary reſources in ſevere and anomalous diſeaſes, where the ſurgeon could hardly tell whether obſtruction or ſtone or diſeaſed bladder was the cauſe of the complaint; that every one operation was deduced from ſome other; that De La Faye is here inconſiderately deſcribing, inſtead of the ſimple operation of paracenteſis, the deſperate reſource of introducing a canula: that he is unconſciouſly repreſenting the operation of the canula, inſtead of paracenteſis, we are aſſured by a ſucceeding paragraph *, in which he teaches how to inject the bladder with barley-water, honey, and various other medicines, when ulcerated or foul.

But this operation, if repreſented with a little more plainneſs and ſimplicity, would appear highly worthy of attention, and the analogy of the apparatus-major, the worſt method of lithotomy, would be univerſally followed as the beſt and ſimpleſt method of performing the operation of paracenteſis. Thoſe old ſurgeons introduced a ſtaff, and at the place where it ſtopped in the perinæum, they made an inciſion, cut into the urethra, run their probes, or dilators, along the membranous part of it, and forced their way into the bladder, by dilating or cutting the neck.

Let us reflect on this operation and its conſequences. When the catheter is obſtructed and can by no means be forced into the bladder, what is the difficulty? ſome ſtricture, amounting almoſt to obliteration of the membranous part of the urethra, or more frequently an induration of the proſtate. Where is the catheter arreſted? always near the point of the proſtate gland; it ſtops juſt where the point of the catheter paſſes the finger laid on the perinæum, and at that place where it is felt upon introducing the ſame finger into the rectum. If the catheter could

* "Quand la veſſie eſt baveuſe ou ulcerée on y fait des injections par le moyen d'une ſonde à poitrine, que l'on y introduit par la plaie après en avoir ôté la canule. On fait d'abord ces injections avec une eau d'orge, à laquelle on ajoute quelque tems après du miel roſat, et enſuite une dixième partie d'eau vulneraire. On en fait auſſi par le canal pour le laver et le nétoyer. Le ſeton doit être très-long. La partie qui n'eſt pas encore entrée dans le canal doit être roulée et enveloppé dans un linge. Chaque fois qu'on panſe la plaie on en tire et on en coupe ce qui a été dans le canal depuis le dernier panſement: l'on doit avoir graiſſe auparavant la portion qui doit y entrer. Si les duretez du perinée réſiſtent dans la ſuite à ces remedes, on fait quelques frictions d'onguent mercuriel, et l'on applique au lieu de l'emplâtre du dyachylum, celui de *Devigo, cum mercurio quadruplicato.*" De La Faye, page 212.

be thruſt through this obſtruction and driven into the bladder, even at the expence of ſome violence, and much blood, would ſuch rudeneſs be fatal? by no means, ſuch an operation would, on the contrary, give preſent relief.

If either by thus puſhing on the catheter with ſome laceration of parts within, or if, by a ſmall inciſion in the perinæum, the courſe of the urethra could be recovered, and a probe paſſed along it, or the common grooved directory, or any ſuch inſtrument introduced, would ſuch injuries be at all equal to thoſe I have enumerated? or would the danger of inflammation, when the neck and natural opening of the bladder were thus forced, be at all comparable with theſe dangers, which muſt accompany a wound of its body, whether from above the pubis, or from behind the proſtate gland? ſurely not. If ſurgeons would but condeſcend to make themſelves correctly maſters of this piece of anatomy; if, having paſſed the male catheter as far as it could go, they would then, with a ſmall inciſion, ſeek out the obſtructed part of the urethra, they would be able either to help on the catheter with the probe, or to dilate the urethra, or to force the proſtate gland, by paſſing a female catheter ſtraight on from the point where the male catheter ſtops; and a wound ſo bloodleſs, ſo far from the pelvis or abdomen, ſo nearly reſembling the thruſting on of the catheter, affecting merely the neck of the bladder, might be reſorted to early, and many precious lives be ſaved.

FIFTH METHOD.

If there be a method which may be put in competition with this, it is that of puncturing from the rectum. I am not indeed ignorant that this way of reaching the bladder lies under the formal proteſt of ſome writers, but they are of thoſe who have written about ſurgery by conjecture, whoſe authority ſtands on no other grounds than reaſoning; and what reaſoning can diſcover any thing ſuperior in the common and rude operation of making inciſions in the perinæum, when compared with this of puncturing from the bladder? The ſurgeon muſt have little confidence in either his reaſoning or experience, who ſays, "we ſhall therefore diſmiſs this method (viz. the puncture from the rectum) without farther conſideration." Yet this is wiſely ſaid, for the queſtion will bear no reaſoning; firſt an operation is deſcribed, in which after inciſions long and deep in the perinæum, a trocar is plunged into the bladder, ſometimes through the diſeaſed proſtate, but more frequently behind that gland, if the deſign of the operation be truly fulfilled; and next, the puncture from the rectum is proteſted againſt becauſe the trocar may wound forſooth the veſiculæ ſeminales, when in fact the operation by inci-

ſions in the perinæum brings the trocar to that very point, where, if ſtruck from the rectum, it muſt enter.

The project of puncturing the bladder from the rectum, originated, like many valuable inventions, in accident. The ſurgeon introducing the finger into the rectum, felt the bladder diſtinctly; and to uſe the expreſſion of one gentleman (who however unfortunately neglected the hint) "the bladder was felt ſo diſtinctly, and the fluctuation of urine was ſo obvious, that the ſurgeon was conſcious he could have ſtruck a lancet into it as eaſily as into a vein." Others more confident did actually ſtrike the trocar into the bladder, through the walls of the rectum, and draw off the urine very eaſily, and had the happineſs to find that the canula could be retained, and that when, by accident it ſlipped out, the perforation ſtill continued open, ſo as to permit the urine to paſs, and yet the contraction of the levator-ani muſcle ſhut the opening like a ſphincter, ſo that the urine never flowed except when the bladder was ſufficiently full to excite deſire, and when the natural courſe of the urine was reſtored, the opening betwixt the bladder and rectum ſpontaneouſly healed. With ſuch advantages, with no important parts endangered in the operation, this method is unfortunately limited! it was once practiſed very happily in a child, whoſe urine was obſtructed by a ſtone ſticking near the glans penis; it has been practiſed alſo with the beſt effects in young men, who have had the urethra burſt, by falls upon the perinæum; but it is to be preferred chiefly in caſes where the obſtruction is temporary, and when we have reaſon to hope that the natural courſe of the urine will be ſoon reſtored; but in the moſt frequent and moſt diſtreſſing of all caſes, the diſeaſe of the proſtate, this method I fear cannot be of uſe.

SIXTH METHOD OF FORCING THE CATHETER.

The diſeaſe of the proſtate gland, which imbitters ſo often the laſt ſtage of life, of which Dr. Fothergill, and many men eminent in literature and ſcience, have died, is that chiefly in which the operation of paracenteſis is required, a wretched reſource which only prolongs life.

The ſurgeon is aware of his patient's condition, for he has attended him for years, and witneſſed the ſlow but unceaſing progreſs of this malady; he has frequently been called to attend him in ſlighter obſtructions of urine, and has remarked the flattened form which the fæces take, he has heard the feelings of the patient often deſcribed, who, along with a continual ſenſe of preſſure and fulneſs in the pelvis, has an unceaſing deſire to paſs his urine; when attempting to give him relief by

the bougie, he has remarked the point of it turned backwards, and when next he has betaken himſelf to the catheter, and forced it through the paſſage, he has felt with the finger in ano, that the proſtate gland filled the pelvis, and compreſſed the rectum; he has witneſſed the frequent returns of theſe paroxyſms of particular difficulty, and lived in the continual fear that the obſtruction would in the end be final and inſurmountable. At laſt, from ſome unfortunate ſulneſs of the bladder, from ſome accidental cold, from piles affecting the rectum, and producing irritation and irregular ſpaſms in theſe parts, the urine is retained; all attempts to introduce the bougie, or to inſinuate the flexible, or force in the rigid catheter, are in vain; fomentations, poultices, and ſtimulant embrocations, produce no relief; the bladder, contracted by long diſeaſes, bears the diſtention very difficultly; though it is but ſlightly diſtended, the anguiſh is intolerable, the abdomen inflames, and fever comes on, with parched tongue and rapid pulſe, and thirſt, which cannot be indulged. Then the ſurgeon is ſorely tempted to do a thing which will give inſtant relief, but which is yet attended with unequivocal danger! he feels that he could drive the catheter forward into the bladder, but not perhaps in the regular canal, nor without tearing through the membranous part of the urethra, and plunging through the ſubſtance of the diſeaſed proſtate. Authorities for ſuch a practice we have none, or next to none; unleſs it be an authority for this deſperate plunge, that the caſe is deſperate, and very deſperate the operations to which we muſt next reſort.

Mr. Ware, in diſſecting a patient who had died of this diſeaſe, having begun his diſſection by drawing off the urine, found that his catheter had, with no great force, been driven through the membranous part of the urethra, into the cellular ſubſtance of the rectum, and thence into the bladder, through the ſubſtance of the proſtate gland; and he naturally and juſtly infers, that had the ſame force been uſed in the living body, the violence would not have been fatal, the relief would have been perfect. The celebrated Dr. Hunter being occupied along with a ſurgeon, in trying to introduce the catheter, was entirely foiled, and the ſurgeon had gone home for a trocar to puncture the bladder; but the doctor meanwhile trying the catheter, and uſing perhaps unjuſtifiable force, it ſtarted ſuddenly into the bladder: the patient was for the time relieved, but the abdomen being inflamed, he died on the third day, and it was plain, upon diſſection, that the catheter had burſt into the bladder, through the ſubſtance of the gland. Dr. Hunter affects to ſay, that this was his deſign: but ſince the ſurgeon was actually gone for the trocar, we have reaſon to believe that the doctor did not deſign to perform ſo important an

operation, ſo unprecedented, and ſo adventurous, in the abſence of the ſurgeon, but gave a poſt facto reaſon for what happened merely by chance, by what might have been named, in a leſs eminent perſon, imprudence and raſhneſs.

Deaſe, a man intrepid and fearleſs, and who had not (to a ſurgeon perhaps it is no reproach) all the delicacy and gentleneſs of nature, which was ſo juſtly admired in Dr. Hunter, and which in his own peculiar department, had ſo conſpicuous an influence on his practice, was in the habit (and I can aſſure the profeſſion of this curious fact) of driving his catheter right onwards into the bladder, when at any time, gentle means and art or cunning failed: he allowed no degree of difficulty to frighten him from his purpoſe: he aſſured me of his ſucceſs: and upon leaving me, preſented me, as a token of remembrance, with two flexible catheters of uncommon ſize, bent at the heel, into a very acute angle, and furniſhed with very ſtrong iron wires, aſſuring me that he had often uſed them thus ſucceſsfully, and ſoliciting me to make that bold uſe of them, which, thank God I have never had occaſion to think of. I would not willingly acquaint a tyro in ſurgery, with an expedient ſo full of danger; if the catheter, ever is to be forced thus, let it be done by a man of judgment and ſkill, one who has experience to diſtinguiſh when it is allowable to have recourſe to ſuch an expedient, and who has ſo much addreſs as to be in no danger of uſing force, merely by being foiled for want of art. Whether it is from converſation or books, that I have ſome recollection of a catheter, with a concealed canula, I do not diſtinctly remember. But if ſo raſh a thing has been done I proteſt againſt it, "as a ſword put into the hands of a fool". Such an inſtrument, (a trocar-pointed catheter,) would ſoon be in the hands of every young man, and would prove, in ſurgery, what the crotchet is in midwifery, a mercileſs reſource: in caſes really ſimple it would be uſed, by young ſurgeons, with little diſcretion. The catheter is, I am perſuaded, ſufficient, if ſkilfully uſed, to make its way through almoſt any obſtacle.

The operation of paracenteſis veſicæ is one which the ſurgeon muſt perfectly underſtand, ſince the occaſions are ſudden and imperious; and while he is balancing amidſt imaginary difficulties, or comparing a variety of expedients (none of them without danger) his patient may be loſt. It is an operation which it is moſt important to ſcheme and ſtudy, for various expedients may ſuit the circumſtances of particular caſes. Of all the operations which I have reviewed, any one muſt ſeem preferable to that in common uſe; and that perhaps is beſt which the ſurgeon can beſt perform.

FINIS.

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DISCOURSES

ON THE

DISEASES AND INJURIES OF THE HEAD.

SECTION I.

PRELIMINARY DISCOURSE ON THE ANATOMY OF THE CRANIUM, AND THE RULES OF PRACTICE DEDUCED FROM IT.

IF ever learning has retarded the progreſs of ſcience, it has been in our profeſſion. Phyſicians devoted to ſcholaſtic learning, ſecluded by the falſe dignity which they aſſumed from the actual practice of our art, and from all the ſources of true knowledge, have actually been the authors of theſe aphoriſms and rules which guide the ſurgeon in his moſt important duties, and which hold an influence over the profeſſion even to the preſent hour. Moſt unfortunately for ſcience, Hippocrates wrote with ſuch truth and brevity, with ſo ſound and diſcerning a ſpirit of obſervation, and recited ſo carefully the ſigns of danger in all kinds of wounds and injuries, that he has been held in continual reverence; his aphoriſms have been held ſacred in all ages; and no one has followed him with any more liberal deſign, than that of writing tedious and ſpiritleſs comments on his doctrines. Such were the only ſtudies of the middle ages; ſuch comments formed the ſole occupation of the famous ſchools of Alexandria and Salerno, and of all the univerſities of Europe during the laſt century; ingenious Scholia, on the words, rather than the ſenſe and ſpirit of Hippocrates, exerciſed the ſubtilty of the celebrated teachers, and a vain and ſcholaſtic learning uſurped the place of real ſcience. Hence it has come to paſs, that through all the voluminous writings on fractures of the ſcull, but one ſole doctrine prevails, and one code of rules, deduced not from any conſideration of the eſſential injuries of the

brain itſelf, but from the configuration, ſtructure, and function of the cranial bones; the ſigns of danger, the prognoſtics and the rules of practice, being allied, not with the internal diſorder, but with the form and circumſtances of the fracture, and the mere injury of the bone. Many ages paſſed thus in the unprofitable ſtudy of books, to the utter neglect of practice, and ſcience, in place of being enriched by new facts, was encumbered with the uſeleſs parade and pomp of learning. Books were written not to improve the art, but to blazon the talents of the phyſician who compoſed them, and with a quaintneſs and formality calculated for that ſole purpoſe: Books in our ſcience, like thoſe on theology, were full of endleſs diſtinctions, diviſions, and ſubdiviſions; and ſuch as remain, or are diſtinguiſhed, ſeem to me a ſenſible repreſentation of the eſſential forms of Ariſtotle, a ſhape without ſubſtance. I will not condemn you to wander with me through this deſart and ſterile region, nor rehearſe to you all the follies of thoſe credulous and doting ages; I ſhall not, though it has been a neceſſary duty in my own courſe of ſtudies to peruſe theſe lifeleſs pages, impoſe the ſlighteſt part of the ſame labour upon you: but if there is to be found in this maſs of antique learning any thing really precious, if there be any explanation of the prejudices and errors which ſtill exiſt, if there be alluſions to modes of practice not yet entirely diſuſed, if the rude conceptions, and ſtill ruder operations of the old ſchool, can ſerve to regulate your opinions, or help to reform ſome points of modern Surgery; if, in ſhort, there be any thing pleaſant, or profitable, or uſeful, in this kind of learning, it ſhall be my chief care to ſelect ſuch examples of ancient doctrines, or operations, as may prove intereſting to you, and confront them with the opinions and practices of our own times.

A ſlight ſketch of the ancient doctrines will ſuffice, and will enable you to enter with alacrity on the eſſential ſubject of your ſtudies, inveſtigation of the diſorders of the brain itſelf, and the means of relief, unperplexed by futile diſtinctions, and ſcholaſtic terms. You will, by being made to feel the vanity of learning, attain to a free uſe of your own good ſenſe, and natural reaſon; you will be induced to act with reſerve and modeſty in all your operations, holding in abhorrence that unlimited uſe of inſtruments, that impatient deſire of doing ſomething, of mangling the integuments, and ſcraping and trepanning the ſcull, which was the proudeſt work of the old ſurgeons, and the moſt diſguſting feature in their practice: you will alſo perceive with pleaſure, that modern ſurgeons, leſs learned, and more ſkilful, than the ancients, have, in place of authority, taken plain ſenſe and reaſon for their guide; but they have perhaps unwiſely neglected the ſtudy of thoſe authors whoſe original doctrines, or learned comments, have given a peculiar complexion to our ſcience, and ſometimes thrown diſcredit on the moſt precious rules of practice by an unaccountable mixture of ignorance and folly, with ſound obſervation and ſterling ſenſe.

There are difficulties in the way of improvement of which you are little aware, and you cannot know how pleafing it is to enter on the effential parts of ftudy with a clear unbiaffed judgement. The books we read, the languages from which we tranflate, the terms we ufe, and the mifapprehenfions thofe terms fometimes convey, are all adverfe to the caufe of truth and fcience. It is not poffible that fcience fhould have defcended through fo many centuries, without being ftained and tainted with every prejudice which the caprice and weaknefs of individuals, or the falfe learning of paft ages could produce. Such fpecks and imperfections are not to be eafily removed, and profeffional authors have been at little pains to remove them; books are copied from books, and the new theory is engendered upon the old; fingular and wayward opinions naturally arife from unlooked-for recoveries, or unexpected deaths, and are recorded and perpetuated; and an author who allows his mind to be entangled, and his judgement biaffed by partial and accidental caufes of fuccefs or difappointment, imagines that his own cafes are alone important, while they are mere exceptions to fome more general fact, and imagines it a duty to maintain his peculiar tenets with enthufiafm and zeal, carelefs of their harmony with the general ftate of fcience.

It is neceffary and ufeful, before we enter on more ferious duties, to give a general fketch of the principles of our fcience, to reconcile difcordant doctrines, "and to blow away the mifts which thicken from time to time over the face of truth." It will furely be pleafant to you that I enable you to read every ancient and modern book without any danger of having thefe principles difcompofed, to know the complexions of our fcience through all its ftages, and to affign to each age its prejudices, to each individual author his own extravagance and follies. Should I neglect to help you through this tafk, you would be delayed even in the firft fteps of your progrefs, and would feel how hard a thing it is to diftinguifh truth from prejudice, learning from fcience, the capricious opinions of individual authors from the eftablifhed precepts of the art; what doctrines to approve, what narratives to believe, or to what mafters you might fafely yield up your judgement, or from whom receive the rules that are to guide your practice. Look into the books of the ancients, and you would believe that every capillary fiffure were attended with peculiar danger, and that, without the moft adventurous operations, the patient could not live. Turn again to the books of modern authors, and you would be perfuaded, that "the more violent the fracture, the lefs the danger*;" that your patient, though he lie in a deadly ftupor, with fractures of the fcull, or deep wounds of the brain, needs but to lie undifturbed, and unaffifted, to enfure its perfect recovery. Name me one abfurd or cruel meafure, the ampu-

* Mufitani, Garengeot.

tation of large pieces of the ſcalp, the ſcraping of the ſcull, the widening of fiſſures, the perforating the cranium with many trepans, and opening the dura mater, or even encircling the whole of the ſcull with trepan holes, for every idle ſuſpicion, or imaginary purpoſe, name me an extravagance or cruelty for which the man of books will not bring you forth precedents. If you adhere to one author, you are inevitably wrong; if you read many, you are bewildered; and indeed a whole life ſpent in practice will hardly teach you to reconcile facts, or to attain that ſteadineſs of temper, and maturity of judgement, which ſhould carry you through your profeſſional duties with confidence and peace of mind. If theſe things be true, it is ſurely implied, that you muſt be aſſiſted and directed in your firſt ſtudies, and that the principles of the ſcience, and the rules founded on them, are to be deduced from a wider range of ſtudy than falls to the lot of every reader, and a knowledge of actual practice which the ſtudent cannot have.

The chief object of your ſtudies muſt be, to learn the ſigns and cauſes of danger, and to judge wiſely of the motives which ſhould induce you to operate. We have not, as in former times, one man of ſuperior abilities, and higher education, whoſe province it is to reaſon, judge, and decide, and another of meaner and more mechanical talents, to perform what he directs. The duties, the privileges, and the education of the ſurgeon, are enlarged; the head, which decides on the ſigns of danger, guides the hand which is to bring relief. The ſurgeon is not a mere operator, for, if he were ſo, experience, knowledge, and ſound judgement, would be of no avail: if he were the abject and humble attendant which he was in thoſe days, when phyſicians taught him how to operate, and directed him in every ſtep, he might perform his part of duty, the mere operation of trepanning the ſcull, the day he entered on practice with ſufficient dexterity, and there an end of all ſtudy and improvement. But he muſt be a reaſoning, thinking man, who is to decide for himſelf, and for his patient, the moſt momentous queſtions, judging of wounds and injuries, as the phyſician judges of diſeaſes, by a knowledge of the internal ſtructure, by outward ſigns implying ſome inward phyſical change, by reaſoning, experience, and the precedents of ſimilar caſes.

What is this operation of trepan, that it ſhould have ſo occupied the attention of the learned in all ages, and that its ſlighteſt difficulties ſhould be the ſubject of ſo many volumes? Is it a delicate operation, or really difficult to perform? Is it difficult to cut up the ſcalp with proper inciſions, to bare the bone of its perioſteum, to trepan or ſaw the ſcull, in order either to give vent to blood, or matter effuſed under it, or to raiſe up any portion of the cranium that is depreſſed? By no means; there is in theſe operations nothing formidable, nor any thing which the moſt unſkilful could not eaſily, I fear too eaſily, perform. The difficulties which

perplex the ſurgeon, and which may well diſcompoſe the moſt judicious and ſkilful, are of a very different nature. It is a well eſtabliſhed fact, that often the patient, who lies in the deepeſt ſtupor, revives, (after a long interval, and without our help), to the perfect recovery of ſenſe and reaſon; but had we in that interval, performed any operation, we ſhould have aſcribed his recovery to art. It happens ſtill more frequently, that the perſon who ſeems the moſt ſlightly hurt, who has no mark of injury, or only the moſt inſignificant tumour of the ſcalp, who has never from the time of the blow had one moment of inſenſibility, of ſickneſs, or of pain, has yet ſuffered ſuch an injury of the bone itſelf, or ſuch a ſeparation of the dura mater from within, as cauſes in the end an abſceſs of the brain; the patient is ſeized, after a deceitful interval of eaſe, with ſlight nauſea, tremors, languor, and confuſion of head; but ſo inſiduous and ſlow are the approaches of this kind of danger, that the ſurgeon is hardly aware of it, before the patient is paſt all human aid, and no operation could ſave him.

Such is the uncertainty of thoſe ſigns; ſo often does our patient fall ſuddenly into ſlight paralyſis and faints, and expires while we apprehend no harm; ſo often does he revive from that ſtupor which ſeems to ariſe from extravaſated blood oppreſſing the brain; that the diligent inveſtigation of the true ſigns of danger, of the cauſes of oppreſſion, or ulceration of the brain, and of the various motives for operating in theſe injuries of the head, (a ſevere and complicated ſtudy), ſhould be the chief occupation of the ſurgeon. But it has not been ſo;—operations have been more ſtudied than the means of avoiding them; the aphoriſms of Hippocrates, and the bloody code of practice founded on them, have been implicitly copied into modern books.

If the ancients have been the chief founders of medicine, which I greatly doubt, I know very certainly, that in ſurgery they have done infinite and almoſt irreparable harm. Their aſcendency in poetry and the fine arts I willingly allow; but how could they excel in medicine, much more in ſurgery, who knew ſo little of the ſtructure of the human body, and made ſo unwiſe a uſe of what they knew. Look into their books, and you would believe that the anatomy of the brain or dura mater, the inflammation of its membranes, or the ſtate of its circulation, had no relation to injuries of the head. For the ancients, whoſe obſervations, as a firſt ſtep in ſcience, we may ſafely admire, and the old ſurgeons, or rather the old phyſicians, the commentators and ſcholiats, whoſe abſurd learning we cannot but deſpiſe, were not anatomiſts. Phyſicians were little accuſtomed, till after the age of Veſalius, with diſſections of the human body, ſound or diſeaſed. The doctors of the ſchools never inveſtigated the cauſes of death, by diſſecting the recent body, never ſwerved from the firſt authorities of Hippocrates, and of Galen, his earlieſt commentator; their beſt preparations were the ſpoiled bones of graves and charnel-houſes; they ſtudied nothing but the bare and

naked ſcull; they called this Anatomy, and ſpared no pains to make this Anatomy uſeful.

We cannot wonder that, their ſpeculations in anatomy being thus limited, their remarks were of the moſt trivial nature, and yet of the moſt dangerous tendency. They ſat ruminating in their cloſets over thoſe curious ſculls, and numbered their proceſſes, and deſcribed their ſutures; remarked the irregularities in the thickneſs of the ſeveral bones, and imagined a ſet of ſurgical obſervations ſuited to theſe deſcriptions; obſervations which, though inceſſantly repeated by ſyſtematic writers as leading to important concluſions, are ſuch as no ſenſible Anatomiſt, nor practiſed Surgeon, would think of acknowledging. They were chiefly employed in remarking how wiſely nature had provided againſt the extenſion of fractures by the interpoſition of ſutures, (for ſtill the mere fracture ſeemed to them the principal danger); how the interpoſition of oſſa triquetra, and ſeparate and leſſer oſſifications, occaſioned ſuch aberrations of the ſutures from their regular place as might lead to unpleaſant miſtakes; how the ſagittal ſuture ſometimes extended beyond the coronal quite to the root of the noſe; how flat the ſquamous ſuture was, and how likely, from its want of a ſerrated or ſerpentine form, to be miſtaken for a fiſſure; and how all the ſutures were apt to be obliterated in old age. They obſerved the difficulty, or rather danger, of trepanning the frontal ſinus, for they deſcribed it as dangerous, and maintained that ſuch a perforation could never heal; how the ſpine which runs along the inner ſurface of the frontal bone, and the irregularities of the occipital bone, prevented the ſurgeon ſawing entirely through thoſe parts of the ſcull, without endangering the dura mater. They marked, with eſpecial care, the general ſtructure of the ſcull, conſiſting of two tables, and intermediate cancelli, for the ſake of encouraging the young ſurgeon, with this remark, that the flow of blood, and the change of ſound, when the cancelli are lacerated by the ſaw, announce to him his having ſawed entirely through the outer table; and, finally, they deſcribed various peculiarities of the ſutures, (eſpecially their place, and ſerrated form), which might ſerve to diſtinguiſh them from genuine fractures of the cranium.

Thus did theſe learned phyſicians, (for they were not ſurgeons), attempt, very aukwardly, and with wonderfully little ingenuity, to combine anatomy with ſurgery, and accumulate a ſet of quaint and puerile obſervations, which ſerve but to miſlead, and are fitter to be altogether expunged, than to be thus honourably recorded; for they teach the tyro in ſurgery only how to operate, and that not well; but by no means do they teach him that which is alone important, how to diſtinguiſh danger by its ſigns, or to think of what he is doing, when perforating the ſcull. Theſe remarks begot a paſſion for operating, which time has not entirely ſoftened; they have been copied with all the idle pomp of learned quotation into every modern book; I appeal to you, gentlemen, how much you have heard,

how much you have read, about ſutures and fiſſures, and fractures; about the ſinuſes and the cancelli, the tabula vitrea, and the various irregularities of the thickneſs and thinneſs of the ſcull; and, along with thoſe doctrines, came a rude and barbarous ſyſtem of practice, that of ſcraping fiſſures, of trepanning fractures, of repeating the application of the trepan over a great ſurface, of cutting entirely away whatever parts of the ſcull ſeemed depreſſed, of tearing away whatever ſeemed looſened, of uſing ſaws and terebræ of various forms, when the trepan ſeemed too tardy in thus opening the ſcull, and expoſing the brain!

Thoſe who, on the revival of learning, aſſumed the weary taſk of explaining the firſt writers on medicine, were not men of practical ſkill, but philologiſts, commentators, men of mere learning; and they commented beſt, moſt learnedly, and indeed moſt ſuitably to the text, who ſhewed themſelves moſt ingenious in multiplying the diſtinction of fractures; as thoſe were thought to operate beſt, who found means of applying the greateſt number of trepans to one ſcull. Neither time, nor the authority of great names, nor the learned languages in which thoſe authors wrote, can conſecrate thoſe follies: The great antiquity and high authority of theſe rules, are indeed the cauſe why I ſhall be at more than uſual pains to refute them. Theſe ſelect obſervations and precepts are, by preſcription and time, become a part of our profeſſion; they are ingenious; they ſeem to enſure the natural and eſſential connection of anatomy and ſurgery with each other; they have an impoſing appearance, and lay ſtrong hold on the imagination of the young ſtudent; they are the leſſons the firſt learnt, and the moſt difficult to unlearn, and men who have paſſed with honour through all the gradations of ſtudy, and ſpent years in the ſucceſsful practice of the profeſſion, continue to reſpect theſe obſervations; thoſe even who have, when emergencies required it, perforated with equal indifference, all parts of the cranium, cannot refrain from mentioning the interdicted points, where the trepan ſhould not be applied. But of all the leſſons of the old ſchool, the one moſt dangerous to the young ſurgeon is that which teaches how to diſtinguiſh fiſſures from ſutures; for the rules for diſtinguiſhing fiſſures clearly imply, that wherever ſuch fiſſure is proved to exiſt, it is allowable, it is neceſſary to trepan the patient; and thence a fracture of the ſcull, and the neceſſity of trepanning the injured part, are ſo inſeparably connected in the ſurgeon's mind, as to form the moſt eſſential rule in his practice.

In ſurgical ſyſtems, I do not know any two arrangements more irrational, or more exceptionable, than theſe two: Firſt, That in treating of amputation, the ſubject is always opened with a diſſertation on gangrene, as if the fear of gangrene, or its actual exiſtence, were the ſole motive, or at leaſt the moſt frequent, for amputating a limb. Secondly, That in explaining the operation of trepan, the ſubject is invariably introduced with remarks on the ſutures, the cancelli, the variable thick-

neſs of the cranial bones, and the many ſcholaſtic diſtinctions of capillary fiſſure, fractures, depreſſions, and depreſſed fractures of the ſcull, as if ſuch fracture or fiſſure were the ſole motive, or the moſt prevailing one, for applying the trepan. This, you muſt be ſenſible, is a ſyſtem full of danger, where attention to the anatomy of the ſcull teaches the young ſurgeon to be curious in diſcovering fractures, and where every trivial remark ſeduces him, by inſenſible degrees, into a fondneſs for operation. No; this is not the meaning of our operation; we often perforate with the trepan, to give vent to purulent matter, often to give vent to extravaſated blood, ſometimes on account of a depreſſion of the bone, ſometimes to cut away ſharp points which may hurt the brain or membranes, or to take away balls or foreign bodies nitched into the ſubſtance of the bone, but never on account of mere fracture of the ſcull.

Firſt, You are deſired to remark the conſtitution of theſe flat bones, "that they are compoſed of two tables or plates of ſolid bone, with intermediate cancelli, (or cellular ſubſtance, ſuch as is natural to bone, full of blood-veſſels), which bleed when with your trepan you have ſawed through the outer table, occaſioning at the ſame time a change of ſound." This, though occaſionally modified, you are taught to regard as a rule of practice; and, in every elementary book, you find it to be a moſt important ſubject of debate, whether, in perforating the ſcull, you ſhould uſe the trephine, which ſaws rapidly, or the trepan, which, from making only half circles, cuts more ſlowly; or whether you ſhould firſt uſe the trephine, till you have cut down to the cancelli, and finiſh the more delicate part, the ſawing off the inner table with the trepan.—Never, perhaps, was any remark more unfortunate than this, which refers the ſurgeon to the bleeding and the change of ſound, as ſigns of having cut through the outer table, and teaches him to be proud of ſawing rapidly. Of all operations, this is the one where precipitancy and hurry has the feweſt apologies, ſince the patient uſually lies inſenſible, ſince the ſawing of a bone occaſions no pain, ſince the trepan is an operation where haſte may occaſion the moſt diſmal conſequences, from wounding the dura mater, which, when left uninjured, ſupports the brain, (after the removing of a piece of the cranium), like a ſecond ſcull.

This reminds me of that paſſion, ſo conſpicuous of late years, for inventing inſtruments which will enable the operator to ſaw more rapidly; but, in my poor opinion, thoſe who complain moſt loudly, are thoſe only who know not how to uſe the common inſtruments. I have ſeen an operator ſo conſummately ignorant, as to turn his trephine againſt the ſet of the teeth, and wonder how he got on ſo ſlowly, and call for another head for his inſtrument, believing it blunt. I am perſuaded that thoſe who will be at pains to learn the uſe of the trephine, will find, that a well-ſet ſaw, turned with the hand, works, as rapidly as the judgement can guide it. With what unhallowed precipitancy this moſt dangerous operation is ſometimes performed, I need not repreſent invidiouſly, by ſaying, that I have ſeen the dura

mater wounded, that I have by me preparations in which it is entirely divided by the trepan. The fault is acknowledged by ſurgical writers, with a want of delicacy, with a degree of levity and inhumanity, which is hardly to be endured. Mr Hill, once in performing the operation of trepan on a boy of eleven years of age, continued to turn the ſaw after the bone was cut through; he at laſt withdrew his trepan, looked anxiouſly for the circular piece of bone, imagined he ſaw it lying in the perforation, moving with the motions of the brain, tried with his forceps to pick it out, but in vain, for it ſeemed to ſink with each ſyſtole, and ſo elude his graſp. "Upon this, another gentleman thruſt the end of a ſmall ſpatula at the under ſide of it, to prevent it from ſlipping under the ſcull, and likewiſe with a view to turn it out; but he was likewiſe diſappointed. After all theſe attempts, the piece of bone, to our great ſatisfaction, (ſays Mr Hill), was found ſticking in the head of the trepan. What, by candle-light, ſeemed to be the bone, was only the white dura mater, with a *red circular pricked line upon it*, occaſioned by its pulſation againſt the teeth of the ſaw, during the ſlow working.

"When we began to recollect ourſelves, we *could not but ſmile* at the ridiculous panic we had been thrown into, and that ſo many people ſhould have been under the ſame deception, which was owing to the dura mater's ſubſiding ſo far."

"A red circular pricked line upon the dura mater" of a living perſon! With whatever air of indifference this may ſeem to be related, I intreat that it may make no other impreſſion upon your minds, than as an act of imprudence not to be pardoned; though that operator ſmiled, you I hope will be ſerious, for I do ſincerely believe ſuch a wound, in its moſt uſual conſequences, the moſt deadly that a raſh hand could inflict *.

Secondly, But this firſt ſuggeſtion is inconſiſtent with a rule much more worthy of notice; viz. that "in all circumſtances the ſurgeon ſhould ſaw cautiouſly, on account of the incalculable irregularities in the thickneſs of the cranium, which is univerſally thin in boys and very aged people, and is, during all the middle ſtages of life, extremely irregular, generally thick, but at certain points extremely thin, or excavated by the deep impreſſion of tortuous veins." I approve of ſawing the cranium, in all circumſtances, with prudence and deliberation; but yet I diſcover, in all theſe rules, intrinſic marks of their having been invented by mere ſpeculators in ſurgery, not by ſurgeons; and in the caſes I have juſt related, I find proofs of Turner and

* Such raſhneſs is, I fear, not very rare, and many have thus injured the dura mater, for one who has the honour or courage to confeſs it. "I remember (ſays Turner) that in the firſt little one I trepanned, an accident of this kind befel me, and put me, as well as the warden who ſtood by me, into great conſternation; for, miſſing the piece, we were fearful, finding a rent in the craſſa-meninx, that it was fallen in upon the brain; till, further recollecting, and taking up the inſtrument I had been working with, I found it faſt ſhut within the bone." —Turner, p. 288.—Faſt ſhut in, becauſe they uſed crowns of a conical form.

Hill buſy trepanning where there was nothing to vindicate ſo decided a meaſure; for in truth we almoſt never operate in a mere fracture of the ſcull; we almoſt never operate where the bone is ſound, and the dura mater cloſely attached to the bone; even in caſes of extenſive fracture, we operate only on account of ſome affection of the brain. The dura mater, for example, has by the ſhock been ſeparated from the ſcull, widely ſeparated, and a quantity of grumous and black blood lies betwixt the dura mater and ſcull; or, the bone having been deadened by a blow, has loſt its circulation, a tumour has ariſen over the injured part, the patient begins to complain of ſickneſs, languor, trembling of the hands, and confuſion of head, which ſhews that pus is forming upon the ſurface of the dura mater, and oppreſſes the brain; when we cut into ſuch puffy tumour, we find the bone dry, diſcoloured, and without circulation; and when we apply the trepan, the matter flows through the trepan-hole from under the cranium. Thus the connection of the ſcull with the dura mater is diſſolved, pus or coagulated blood fills the interval, and (though we ſhould in all caſes operate deliberately and cautiouſly) whenever we operate in caſes truly requiring the trepan, the dura mater is depreſſed by blood or pus, and is in no danger even from the raſheſt hand, though ſometimes the worſt ſymptoms ariſe from a very thin cake of extravaſation, or a mere diſcolouring without any great effuſion of pus.

Thirdly, The artery of the dura mater is deſcribed with a particular reference to the operation of trepan. "As an artery of conſiderable ſize, the chief artery of the dura mater, running along the inner ſurface of the parietal bone, marking the anterior corner of the bone with its trunk, and the upper part with the impreſſion of its branches, and making a groove ſo deep, that the bone cannot be entirely cut through by the trepan, without the artery being divided. For theſe reaſons it is adviſed, that the ſurgeon ſhould avoid the whole tract of this artery, and eſpecially that he ſhould not trepan the lower corner of the parietal bone." That the ſurgeon ſhould, except in caſes of the moſt abſolute neceſſity, avoid even the ſhadow of danger, is a precept from which I will not allow myſelf to diſſent. But in this, as in all theſe notable obſervations on the cranium, there are ſtrong intrinſic marks of the reflection coming from one little acquainted with practical ſurgery; for in all circumſtances, and on all points of the ſcull, have I ſeen the trepan applied without much ſkill, or any thing of this foreſight, but never have I ſeen or heard of a hemorrhagy from the artery of the dura mater.

In all caſes it muſt be, that either the dura mater is detached from the inner ſurface of the ſcull, or it is not detached! If the dura mater be detached from the ſcull, and you apply the trepan on account of extravaſation, the artery, as it belongs to the membrane, muſt be depreſſed along with the membrane, the interſtice being filled with blood, and the artery entirely removed from the reach of the inſtru-

ment. If the dura mater be not ſeparated, and you are uſing the trepan on account of mere fracture, and with the deſign of cutting away thoſe points of the fractured bones which might injure the membranes, or for raiſing any depreſſed portion which may oppreſs the brain, even if you did touch the artery of the dura mater, there could be no great nor dangerous hemorrhagy. The artery is ſmall, there is no cavity nor cellular ſubſtance to hide its bleeding orifice; it muſt appear at the edge of the trepan-hole, and muſt ceaſe bleeding ſpontaneouſly, or be ſtopped merely by applying a little bit of lint, preſſing at the ſame time ſlightly with the point of the finger. Therefore, although much has been ſaid about this dangerous artery, lodged ſo deep in a groove of the parietal bone, although the French Academy actually invented an inſtrument with two blades ſcrewed together, one of which was to be laid under, and another above the bone, or propoſed, in place of this, to uſe a piece of ſheet-lead, which, being cut into a proper ſhape, was to have one end laid under, and the other doubled over the bone; whatever ingenious remarks or cunning inſtruments may have been imagined for ſuppreſſing this kind of hemorrhagy, I believe the whole to be a ſpeculation of the cloſet, ſuch hemorrhagy being extremely rare.

Fourthly, You are warned of the danger of wounding another important veſſel, which has greatly alarmed theſe buſy ſpeculators,—the Longitudinal Sinus. You are told, " that the longitudinal ſinus is the greateſt vein of the brain, named longitudinal from its running along the whole length of the ſcull, and changing its name at the occiput, where it forks into the branches which terminate in the great jugular veins, and are called the lateral ſinuſes." When phyſicians were framing conjectures, and amuſing their pupils at lecture, or adorning their books with obſervations, this conſpicuous blood-veſſel could not eſcape obſervation; it was never doubted, that the wounding a vein which conveyed ſo vaſt a proportion of the blood of the head muſt be fatal; and that this conjecture might loſe nothing of its value, it was ſet down as a very abſolute rule, " that the ſcull ſhould never be trepanned in the line of the ſagittal ſuture, under which this ſinus lies."—You are told that ſuch wound is fatal *.

* Speaking of the longitudinal ſinus, De Goerter ſays, " Ex quo ſi rumpitur, funeſta ſanguinis profuſio oritur." And this is in the Chirurgia *Repurgata*. Heiſter ſays, " Qui facile, ac non ſine magno periculo, hic læditur,"—" quem perrumpere peſtiferum eſt."

It is indeed admirable, that Rehault, in the Academy of Surgery, in quoting authors on this ſubject, quotes ſo induſtriouſly in behalf of his own ſide of the queſtion, that he quotes Berengarius firſt, and then Carpenſis, as both agreeing in the ſame ſolicitude about the application of the trepan on the ſutures. There was little danger indeed that they ſhould diſagree, unleſs they had been of the humour of John Lilburn, whoſe epitaph runs thus:

This was a goodly conjecture, and these accurate descriptions were subjoined for the same reason that Corporal Trim puts a date to his story of the seven kings of Bohemia, "to make it look well in the face." This is none of the surgeon's rules, who, if he had at all mentioned the longitudinal sinus, would probably have observed how sluggishly the blood moves along in this great sinus; that it is more properly a reservoir than a vein; that there surely could be little danger in wounding it; that often when we find it necessary to operate in the direct course of this canal, we feel it turgid under the finger, that in such a case the temptation is too strong, not to be yielded to, of striking the bleeding lancet into it, with the hopes of relieving the patient from the lethargy in which he lies. Warner and Pott have both seen the longitudinal sinus punctured by fragments of bone, and the blood flowing from it profusely, which was yet more easily stopped than that flowing from a vein, merely by applying to it a piece of dry lint. Pott and Warner have both, without scruple, opened the sinus with a lancet, and bled the patient from it *.

> "Is John departed? and is Lilburn gone?
> Farewell then both to Lilburn and to John;
> Yet, being dead, take this advice from me,
> Let them not both in one grave buried be;
> Lay John here, and Lilburn thereabout,
> For if they both should meet, they would fall out."

* R. J. aged 13, on the 16th November 1749, was struck with a pointed piece of iron upon the upper and middle part of the head, so immediately upon the sagittal suture, as to force a bit of both parietal bones into the longitudinal sinus. Immediately upon receiving the blow, the boy fell down, and became senseless; but in a few minutes afterwards he recovered, and continued well for six days. At the end of that time, he was seized with epileptic fits, the returns of which were very frequent, accompanied with vomitings, and a palsy of the left side (Hemiplegia); the sight of his left eye was perfect, but his right eye was so affected, as to make all single objects appear double to him. These symptoms continued till the 27th of December following, when he was put under my care. Upon examination, I found the circumstances as described above; and immediately afterwards I proceeded to the operation. Upon taking off the scalp, there issued a continued stream of blood from the hole made through the bone; I applied the trepan so as to include the injured part of the bone, and the sagittal suture within the crown of the instrument. Upon taking out the circular piece of bone, there appeared a wound which was made into the sinus by the bits of bone that were then sticking in it, which I enlarged with a lancet, in order to extract them with less violence. Upon taking out the bits of bone, the discharge of blood was increased; but, upon the application of dry lint, the hemorrhage stopped. Immediately after the operation, the patient fainted, but soon recovered. In half an hour's time, he expressed an agreeable sensation on his left side; and, by the next morning, he had so well recovered the use of his limbs, as to be able to remove them freely to any part of the bed, &c.——Vide Warner's Cases, p. 10.

A girl, aged 16, was knocked down by her mother with an iron poker of considerable weight; the latter immediately ran away, and the former was brought senseless to the hospital. She had a large wound on the top of her head, with a considerable fracture of the sagittal suture. The broken pieces were so large, and so loose, as to be easily removeable without any perforation. When they were taken away, the longitudinal sinus was left bare, at least two inches in length; but no hemorrhage followed the removal of the fragments.

Califen, the celebrated Danifh furgeon, having trepanned a failor who was knocked down by a block falling from above, felt the finus lying turgid under the finger, and feeing no profpect of the oppreffion in which his patient lay being relieved, bled him from the finus with as little concern as he would have done from the jugular.

Callifen, like other innovators, having fallen upon this trivial obfervation, was refolved that it fhould lofe nothing of its value, and accordingly he had the confidence to propofe, that in epilepfy, madnefs, delirium, and in high fever, the fcull fhould be trepanned, in order to reach the longitudinal finus; but we have not heard that any furgeon has chofen to diftinguifh himfelf by an experiment of this kind. I need not enumerate the many facts by which men engaged in actual practice have corrected this furgical conjecture. But I cannot refrain from faying, that conjecture fhould be confined to medicine, when you can do little elfe; for, were this rule for example refpected, the furgeon would be obliged to refufe his help in thofe very cafes which moft efpecially call for it, fince a fracture on the top of the head implies that it is produced, not by any fide-long fall, or common blow, but by a very defperate and perpendicular fall, as from a building, or from a yard-arm on board of fhip, or by ftones or beams falling perpendicularly upon the head, a fracture which, more than any other, requires trepanning.

Fifthly, I am now to fpeak of a rule more purely hypothetical than any I have yet commented upon. The dura mater was fuppofed by the ancients to pafs through the fcull by the indentations of the futures, not merely to connect itfelf with the pericranium, but to form that membrane, and from thence was fuppofed to be derived all the membranes of the body.

The name of Craffa Meninx, or Dura Mater, was derived from this imaginary office of forming all the other membranes, and the furgeons were advifed not to fcrape the futures with the rugine, nor trepan near them, left he fhould injure this moft important connection. The reafons given for avoiding the futures, had no manner of relation to furgical practice, and could have no origin but in the capricious ima-

For three days fhe was bled twice a-day, from one part or other of her, and ftools were procured in fuch manner as was poffible, but to no purpofe; fhe ftill remained perfectly fenfelefs. On the fifth day, finding her ftill in the fame ftate, and verily believing that nothing in art could at all ferve her, I made an opening with a lancet into the longitudinal finus, and fuffered the blood to run off, until her countenance, which was much flufhed, became pale, and her pulfe, which till now had been full and ftrong, though labouring, faultered confiderably; in fhort, till fhe fhewed, as much as a fenfelefs perfon could, the marks of a delirium from inanition. I then put a bit of lint on the orifice, and ordered the nurfe to keep her finger lightly on it, until I had vifited the reft of the houfe. When I returned, the part fhewed no difpofition to bleed again, nor did it ever after. That afternoon fhe opened her eyes, and moved her arms, and the next morning was fenfible enough to afk for drink. She retained her fenfes for feveral days; but a fever coming on, fhe became delirious and convulfed, and died fo on the feventeenth day from that of her admiffion into the hofpital, &c.——Pott, chap. 28. vol. 1.

gination of mere ſpeculators. "Vitandæ ſunt ſuturæ, (ſays Fabricius *), quia per has dura mater exit ad pericranii generationem." But there is a reaſon, worth taking notice of, why they apprehended ſo much danger from approaching the ſutures, or injuring the pericranium, viz. the ſingular nervous ſymptoms which ſometimes enſue after a mere wound of the ſcalp, without any the ſlighteſt injury to the bone, or to the brain. The nature of this affection I ſhall afterwards explain; at preſent it is natural to remark, how well the doctrines of the old ſurgeons agree with theſe facts. Guy de Chauliac, for example, having conned over the aphoriſms and deſcriptions of Hippocrates and Galen, and enriched his imagination with ſome of the notions of Avicenna and Albacaſis, deſcribes the pericranium thus: "De groſſo panniculo quem Galen vocat pericranium, qui cooperit totum cranium, eſt ſciendum, quod eſt nervoſus, et oritur a dura matre, et ligatur ab ea, ligamentis, nervis, venis intrantibus et exeuntibus per *commiſſuras cranii*," "et conjungantur oſſa cranii cum commiſſuris ſerratilibus, *ut vapores ab ipſo cerebro valeant expirare* †." The opinion was univerſal. Columbus ſays, in his Anatomy ‡, "Provida natum perforatam eſſe, voluit calvariam variiſque ſuturis diſtinctam ut purgando a recrementis cerebro nuſquam occaſio deeſſet." Numberleſs are the examples he has retailed of good old folks tortured with megrims, for no other cauſe than this purgation of the brain being ſuppreſſed; and he imagines he proves this by finding, in diſſection, their ſutures either obliterated, or very cloſe. "Inde collige (ſays Mangetus) capitis ſuturas ad valetudinem non parum conferre." In Poland the ſutures are ſaid frequently to have burſt from the ſavageneſs of the plague; and a tale is told in Bonetus ||, of a German colonel, who drank one day of Luttenburgh wine, till the ſutures of his ſcull cracked and burſt; but then he had the advantage, that from this time forward he could drink without ſtint or meaſure, like the Scandinavian Hercules, who drank on, and would have drunk for ever, to win his wager, if he had not obſerved that the other end of his drinking-horn was in the deep ſea §.

The ſurgeon is called upon to remark the peculiar firmneſs with which the dura mater adheres to the ſutures, and counſelled not to apply the trepan exactly upon a ſuture, when the dura mater adheres ſo, but on each ſide of the ſuture, ſo as to be thus

* § 725. † p. 12. ‡ Lib. i. cap. 5. || p. 52.

§ Vide Mallet's Northern Antiquities.—It was Columbus that alarmed the medical world with this apprehenſion of painful and fatal conſequence ariſing from the cloſing of the ſutures. "Patavii ſuperioribus annis juvenem quendam propinquorum voluntate ad me delatum, domi in magno amicorum corona ſecuti qui diuturno capitis dolore vexatus nullis remediis ſanari potuerat, in cujus calvaria vix ſuturarum veſtigia apparebat, adeo erat compacta in unum, coacta capitis oſſa viderentur.

Sed neque ſemel id mihi contigit experire, complures enim ſecui, qui dum viverent in frequentem capitis dolorem incidere ſolebant, in quorum calvarias, exiguas ſuturas, et eas coagmentatas, vidimus.

Certiſſimum ergo argumentum nobis erit, capitis ſuturas non modo conferre ad ſalutem corporis tuendam, vero eo plus conferre quo majores laxioreſque fuerint.

ſure of finding the extravaſation. But I no more find this adheſion capable of limiting extravaſation, than the ſutures capable of ſtopping fractures. I find the extravaſation always extending beyond the place of the ſutures, and covering very generally one entire hemiſphere of the brain. I never ſaw any occaſion for applying the trepan, firſt on the one ſide, then on the other ſide of the future, though much has been written on this ſubject. I find in no book a proof of extravaſation having been limited and interrupted by intervention of a ſuture, nor one caſe unequivocally ſtated, where the ſurgeon, having applied his trepan on one ſide of a ſuture, was obliged to repeat his operation on the other ſide.

Sixthly, In deſcribing the frontal bone, its internal ſpine or ridge running longitudinally along its inner ſurface, is pointed out as particularly intereſting to the ſurgeon, as being an abſolute bar to the perforating of that part of the bone. The obſervation ſeems important, the difficulty ſeems demonſtrable; but this, though it be a difficulty which muſt naturally preſent itſelf to the imagination of the ſpeculative anatomiſt, is one which can have but a ſlight influence over the reſolution of the practical ſurgeon. He recollects, that in moſt of his operations, even upon the moſt level and equable parts of the cranium, he ſeldom dares to cut both tables of the cranium entirely through, but leaves part of the circle uncut, and begins with his elevator to poiſe out the ſawed piece of bone, before it is entirely inſulated; the part that is uncut uſually breaks and ſplinters with an audible noiſe, and he ſmooths the ragged edges of the trepan circle with the inſtrument named Lenticular. Though a well-inſtructed ſurgeon will not fail to recollect this internal ridge of the os frontis, he will nevertheleſs perforate here when the operation is required at this point, with this ſole precaution, that he will ſaw more circumſpectly, will cut through all that he ſafely can of the circle, burſt up the reſt, and ſmooth the ragged edges of the hole. It is only in one ſingle point, at the very root of the noſe, at a point conſiderably lower than we ever need to perforate, it is only in the very middle betwixt the brows, and in a ſpace no bigger than one crown of the trepan will cover, that this ſpine can at all prove an interruption. I know no miſchance, by which the moſt ignorant perſon could be induced to apply the trepan ſo low, and believe that there is more danger of a thoughtleſs operator doing harm when trepanning upon the ridges of the occipital bone; but in neither the one place nor the other is the trepan required; of an hundred caſes in which this operation is required, the inſtrument is placed in ninety-nine caſes upon the upper parts of the ſcull, upon the parietal or frontal bones *.

* Whether the temporal muſcle ſhould be cut, was long and violently debated, and the *veto* of the phyſicians was very abſolute. Thus Muſitani, p. 162. ſays, "Male ſani chirurgi vulgares acerrime rixantur, An vulnus in temporibus dilatandum ſit? Verum juxta noſtra principia (according to our principles and reaſoning) et ſupra allatas rationes, talem dilatationem reſpuimus, etiamſi oſſis fractura adeſſet, quia incideretur muſculus temporalis,

Such are the conjectures of the ſpeculative anatomiſts, deduced from the anatomy of the naked bones, and relating to the operation only, and not to the diſorder produced by the blow or fall. Theſe are named the interdicted points of the ſcull, as if the ſurgeon were to be reſtrained from performing the moſt important of all operations from ſuch ſlight conſiderations; theſe were yet the beſt and moſt important leſſons they had to offer; they are inſtilled into the mind of the ſtudent to this day with particular diligence, and he never ſuſpects them to be trivial, till he finds the daily occurrences of every hoſpital give the lie to every one of theſe rules. Were we to receive this catalogue of interdicted points in its literal ſenſe, there remains no point of the ſcull which we could trepan with abſolute ſafety; if we reflect upon the ſubject, we muſt be convinced, that there is no one point on which the ſurgeon may not, with an ordinary degree of ſkill, perform the operation of trepan. Far from allowing any degree of merit to theſe remarks, I do moſt impartially declare, that wherever I have known the operator's head teeming with this kind of knowledge, wherever I have obſerved him calculating where he could ſo apply the trepan, as to keep clear of the frontal ſpine, or ſuperciliary ridge, or longitudinal ſinus, I have invariably found him wrong, and ſtubbornly wrong: But that I may not ſeem to treat with levity or ſeverity the wiſe and ſober directions of the ancients, or the ſervility of modern writers, I ſhall make ſome more deliberate remarks on the operations upon the lower part of the forehead.

The rules which I deprecate, often incline the young ſurgeon to deviate from the plain way of common ſenſe, and, by avoiding imaginary, he runs into real dangers. To underſtand the caſe I am now going to relate, you muſt aſſent to one principle, which I ſhall afterwards prove in the moſt unequivocal terms; and it is this: "That mere depreſſion of the ſcull, which was once believed to be the moſt perilous of all accidents, has really but a very ſlight effect in compreſſing the brain." The line of a depreſſed bone deviates but in a very ſlight degree from the natural convexity of the ſcull; the depreſſion, as ſuch, produces no compreſſion, for the patient walks about unaffected, or but very ſlightly; and if he falls into a dangerous ſtate, it is indicated by tremblings of the hands and knees, a ſort of imbecillity, ſlight ſhiverings and nauſea, which are ſigns, not of compreſſion, but ulceration of the

quo ſecto, delirium, caros, et alia peſſima acciderent ſymptomata." And all this he ſays, becauſe Hippocrates had ſaid it; "Quibus tempora ſecantur, convulſio in contraria parte oboritur." Hipp.—"Vulnera quæ fiunt in muſculo temporali, ſunt lethalia." Hipp.—I do not know that ſurgeons or phyſicians were, in any age, even the moſt ignorant, ſo much afraid of any danger reſulting from ſuch inciſion, as fearful of the reproaches of their brethren, ſhould they violate any important aphoriſm of Hippocrates. Hippocrates declares, that an inciſion into the temple produces convulſions, xix. "At vero in capitis ſectione, reliquæ quidem capitis partes ſecuritatem habent dum ſecantur. Verum tempora, et adhuc ſupra tempora venam, quæ per tempora fertur, ſecare non oportet. Convulſio enim corripit ſectum," &c.

SKETCHES OF THE SEVERAL POINTS, PROCESSES, & SUTURES OF THE SCULL.

To face Page 304.

a The Frontal Bone.
b The Parietal Bone.
c The Temporal Bone.
d The Occipital Bone.
e The Cheek Bone.
f The upper Jaw Bone.
g The lower Jaw Bone.
h The Nasal Bones.
1. The Coronal Suture.
2. The Lambdoidal Suture.
3. The Squamous Sutures.
4. The Mastoid Process.
5. The Styloid Process.
6. The Pterygoid Process.
7. The Zygomatic Processes.
8. The Bump, or Rising, which marks the Place of the Frontal Sinus.
9. The Frontal Sinuses opened by trepanning the Bone.
10. The Frontal Sinuses opened in cutting off the Scull Cap.
11. The Frontal Spine or Ridge.
12. Furrows of the Artery of the Dura Mater.
13.—14. The Inequality of the Cranium in Respect of Thickness.—Massy at 13, the Occiput—thin and delicate at 14, the Temple.

bore the perpendicular poſture, and ſuffered the operations of the dreſſer; though he anſwered pertinently to all our queſtions; his articulation was ſlow, his motions languid and liſtleſs, his eye oppreſſed, his breathing anxious, and accompanied with ſighing. There was a ſort of ſardonic grin, or diſtortion of face, and a ſillineſs or fatuity of look. His pulſe was quick and irritable, his tongue parched; he had a hectic fluſh upon his cheek. Though he made no complaint, he was ſickly, his hands trembled, he vomited frequently during the night. He was always ſlightly delirious during the night, before he was thoroughly rouſed; and during the day, he walked round his bed, fumbled about the cloaths, ſeemed to wiſh to do ſomething, yet had no purpoſe. In ſhort, he was in a ſtate of indeſcribable diſorder, never ſoundly aſleep, nor entirely awake; and, though his ſickly condition conveyed no intimation of approaching danger to his ignorant friends, it could not but be obſerved by his medical attendants; for theſe are the ſigns, ſlight as they appear, which announce ſuppuration within the cranium, and approaching palſy.

"A conſultation having adviſed that the patient ſhould be trepanned, the operation was performed with ſuch circumſtances of miſconduct, as I think very impreſſive and inſtructive. There was a large tranſverſe fracture acroſs the lower part of the frontal bone, with one limb extending into the orbit. The lower part of the bone above the frontal ſinus was depreſſed the full thickneſs of the bone, and the depreſſed portion of the bone was plainly carious, black, and dead. Unhappily the rules of ſurgery, which the operator but too well remembered, and applied too accurately, were in every thing oppoſite to the dictates of good ſenſe. The rule ſays, "Apply your trepan upon the ſound bone, which can beſt bear it, that you may be able to preſs your levator under the depreſſed bone through the trepan-hole." But common ſenſe directs no man to cut away a ſound and living portion of the cranium, to ſave by elevation a part which is depreſſed, and perhaps dead. The rules of ſurgery ſay, "You ſhall not trepan on or near the frontal ſinus;" while common ſenſe requires the ſurgeon to perforate wherever any cauſe of danger exiſts. The rules of ſurgery would impreſs us with the belief, that "of all the accidents of fracture, depreſſion of the ſcull is the moſt fatal cauſe of compreſſed brain, and the one which moſt immediately requires the operation of trepan;" while this very caſe, combined with a thouſand collateral proofs, ſhows how ſlightly the greateſt depreſſion of the cranium affects the functions of the brain, for fifteen days had elapſed before it was diſtinctly known that the bone was depreſſed, or the man in danger.

Though the depreſſion of the ſcull was, in this caſe, the circumſtance which ſhould chiefly have attracted the attention of a tyro, thinking only about the anatomy of the ſcull, and imagining nothing more correct or abſolute than theſe mechanical rules; the carious or dead part of the bone affecting the dura mater as a foreign body, would alone have appeared important to one who reaſoned on the affections of the brain, and knew them by their ſigns. The one would have thought only of elevating the depreſſed portion of bone, the other of cutting away whatever was dead. The one would have applied the trepan upon the ſound bone, the other would have applied it upon the injured part.

Reſolved to perforate as far as poſſible from this formidable ſinus, the frontal ſinus, the operator, inſtead of elongating the triangular wound of the integuments downwards, prolonged it by inciſions upwards, and applied the crown of his trepan upon the ſound and undepreſſed bone above the fracture. The os frontis was extremely thick, like that of a rachitic perſon; in avoiding the frontal ſinus, he encountered the frontal ſpine, and was, though it may ſeem incredible, fully an hour in accompliſhing the perforation, the patient all the while crying out, ſtruggling, and taunting him with expreſſions which I thought he very well deſerved. But, after having ſacrificed this ſound part of the ſcull in favour of a part carious and irrecoverable, he found the depreſſed portion not only well able to bear the working of the trepan, but ſo exceedingly firm, that no force of levers could enable him to raiſe it. The operator, conſcious that he had by this perforation done nothing effectual for the relief of a patient who had endured ſo much, was now willing, after an intermediate conſultation, to attempt what ſhould have been done at firſt. The inciſion of the integuments was carried downwards through the eye-brow, to the root of the noſe; the whole extent of the depreſſion, and of the deadened portion of the bone, was now diſplayed. The fracture was ſeen running down into the orbit; the operator would have now applied his trepan upon the depreſſed portion which ſhould have been firſt cut away; but, after operations and conſultations laſting an hour and a half, the patient, exhauſted by his cries, reſiſtance, and loſs of blood, the manifeſt inhumanity, too, of continuing ſuch unavailing cruelties, induced the ſurgeon to commit his patient to bed, where his reſt was long and ſound. What he ſuffered afterwards I had not the courage to inquire, but he died.

This would be a long, impertinent, malicious tale, were it not related without names, and for the beſt of purpoſes, to prove to you, that thoſe conjectures, dignified with the name of rules, which you might imagine were the moſt in-

controvertible, and uſeful diſcoveries in the profeſſion, are the moſt to be ſuſpected.

The alarm about wounds of the frontal ſinus has been univerſal; the injunctions not to approach it with the trepan have been tranſcribed from book to book, in the ſame unvarying language. After ſuch prejudices has prevailed for ages, and authority been accumulated upon authority, we cannot become all at once familiar with the idea of trepanning a fracture, or opening an abſceſs in this part as freely as we ſhould in any other. This cavity, which is formed within the inner end of each ſuperciliary ridge, betwixt the two tables of the frontal bone, is the firſt of that great train of cells which occupy all the ſpace betwixt the cranium and the face *. Its place is marked by the bump or prominence on the forehead, from which the root of the noſe ſprings, and is very generally proportioned to the degree of prominence in that part. The frontal ſinuſes of each ſide uſually communicate with one another by ſmall round openings, and always with the noſtrils, unleſs when the communication is interrupted by diſeaſe. Theſe, like all the other cavities, are lined with a delicate and ſenſible membrane, extremely vaſcular, and ſubject to diſeaſe. But that fractures of this part ſhould never heal, that trepanning this part was not merely difficult, (for that muſt be allowed), but full of danger, is a conjecture which could have come into the imagination only of thoſe who were more familiar and more delighted with the amuſing conjectures, than the inſtructive labours of ac-

* The frontal ſinus probably contributes more than any of the other cells to form an important part of the organ of ſmell.

Nothing can be more ludicrous than the following paſſage from Blumenbach, concerning the uſe of theſe cells: "Quod autem creator Op. Max. humano naſo tum inſignibus ſinibus, tamque *mira* et *intricata* fabrica ſtuduerit, hoc vero tanto magis ejus bonitatem declarat quanto certius homini naſus, non, ut cæteris animantibus, tantum neceſſitatis cauſa, ut victum nempe diſcernere poſſint, ſed *magnam partem ad voluptatem quoque et jucunditatem eſt.*" —"God be praiſed (quoth Blumenbach) that it hath pleaſed him, in his infinite mercy, to ſtudy with ſuch fatherly care the ſtructure of the human noſe, for verily he hath given to man a noſe, not like unto that of the lower creatures, merely for ſmelling out his food, but moſt principally hath he conformed that voluptuous member for enjoyment and the pleaſure of man." If this be not a good preface to Slawkeubergius's tale of the promontory of noſes, it is at leaſt no ſlight authority (viz. that of a medical profeſſor) to Triſtram's doctrine of noſes. "Nihil me penitet hujus naſi."

But the beſt illuſtration of the uſe of thoſe ſinuſes is to be found in the comparative anatomy of the lower animals. The bear, the polar bear, of a rough and grunting voice, has innumerable and enormous frontal ſinuſes; its ſmell is wonderfully acute in ſmelling out roots, finding honey, &c. Dogs have great cells, and the larger the noſe, and the more precious the dog, the greater is their extent. The horſe, which is ſo ſubject to diſeaſes of the ſchneiderian membrane, has two large frontal cells, and has a ſmell ſo acute, that being brought even to the ſpot

tual practice *. Monſieur Palfin, a celebrated ſurgeon of Gand, the firſt who had the good ſenſe to think of ſurgical anatomy, or to decorate his book with this attractive title, was yet not ſuperior to the vulgar prejudices in relation to this part. "I think it right (ſays Palfin) to warn the ſurgeon not to apply his trepan upon the frontal ſinus, for the opening will remain fiſtulous, nor to miſtake its lining membrane for the dura mater, nor its mucus for the ſubſtance of the brain *." We cannot wonder to find ſuch errors univerſally received, where Fal-

where mares have lately been, he ſnorts and neighs, as is commemorated in the tale of the election of Darius Hyſtaphis.

The goat, ſheep, ſhamois, bull, elephant, &c. have the frontal ſinuſes extremely large, and have a nice ſenſe of ſmell for the election of food.

The elephant eſpecially has a ſcull not compoſed like that of other animals, viz. of ſeveral bones joined by ſutures, but apparently of one-continued bone, conſiſting of two tables, extremely thin, ſet at the diſtance of half an inch from each other. The tables are each not more than a line in thickneſs, the whole interſtice all over the ſcull is divided by thin partitions into innumerable cells, and with a very vaſcular membrance, communicating with each other by ſmall openings, and the loweſt of theſe cells opens into that great tubular cavity on which the proboſcis is implanted. Each of theſe numerous cells is, in reſpect of uſe and ſtructure, a frontal ſinus, and the reſult is, a ſenſe of ſmell ſo exquiſite, that the elephant can be rivalled by no other animal. For if among a heap of money thrown together by the ſpectators, his keeper touch but one of the pieces ever ſo ſlightly with his finger, the creature will ſeparate and pick up that coin, though mixed with a thouſand pieces of the ſame coin which had been handled by others.

This is, I think, the moſt deciſive proof of all of the peculiar offices of the frontal cells; indeed, the pain we feel in the forehead upon ſmelling volatile ſalts, convinces us feelingly, that they form at leaſt a part of the organ.

* When an author undertakes to treat ſo trivial a ſubject as the anatomy of the frontal ſinus, he is right to make the moſt of it; ſo does Blumenbach, who blows up his bubble to the ſize of a quarto, and is very learned and wonderfully ingenious. He is particularly ſo when he explains the cauſes which occaſion this cavity, which we call the frontal ſinus. Theſe cavities are produced by (what for a ducat?) the action of the frontal muſcles, pulling the outer away from the inner table of the bone; and this he moſt potently believes, becauſe children are given to fretfulneſs and crying, "idque nobis ex eo probabile eſt, quod pauci muſculi faciei in infantibus tenellis toties inacta ſint, quoties ipſa hæc epicranii pars anterior." The opinion of the illuſtrious Haller, who had given away this high office to a moſt inſignificant muſcle, the muſculus naſalis, he holds in great contempt "corrugatori ſuperciliorum cui hanc ſinum efformationem committit illus: Hallerus parum tribuerem, eam preſertim ob cauſam, quod multa ex infra recenſendis animalibus magnis certe frontalibus ſinibus, nullis vero corrugatoribus muſculis, ſunt perdita."——*Blumenbach de Sinibus Frontalibus*, p. 8.

† "Il eſt bon d'avertir en cet endroit les chirurgiens, de ne pas appliquer le trépan ſur les ſinus de l'os du front parce que l'ulcère reſteroit fiſtuleux; et de ne pas prendre la membrane qui les revêt pouce la dure-mere. Il eſt auſſi quelquefois arrivé, au ſujet des playes pénétrantes dans ces cavitez, que la morve etant trop abondante, ou trop épaiſſie, et devenüe griſâtre, et s'echappant par la playe, des chirurgiens ignorans l'ont priſe pour la ſubſtance corticale du cerveau; de ſorte quils ont crû que l'application du trépan etoit néceſſaire. Ce qui montre com-

lopius, at once the greateſt anatomiſt and practical ſurgeon, aſſures us *, that wounds of theſe ſinuſes never heal, and adds his authority as a ſurgeon, "That he never ſaw ſuch a wound cloſe, except once in a child, in whom the cavity filled up with a ſpongy ſort of gramulation." A remark or conjecture rather obtruded upon us as a fact, is at all times diſguſting; and in this Fallopius is moſt unfortunate, ſince in a child, neither the frontal ſinus, nor any other bony cavity is yet formed, becauſe, as Blumenbach might ſay, "the frontal muſcle has not long enough operated upon the bone." But it was the cuſtom of theſe theoriſts to repeat and multiply their conjectures till they themſelves believed them facts. Of this paſſion for conjecturing, what conſequences ſhould follow a wound of the ſinus, there is not a more conſpicuous example than the tale told by Palfin, about the apothecary of Louvain! "In the year 1701, I ſaw an apothecary at Louvain, who having been wounded ſome years before in the left frontal ſinus, was, notwithſtanding the loſs of bone, cured, the wound having healed up all but a ſmall round hole, ſufficient to admit a pea. When this hole was left open, the air eſcaped through it with a force which I felt very diſtinctly on my hand; and ſo much was he oppreſſed when the air eſcaped thus by the hole, that he was obliged to plug it up with a tent, and fix the tent down with a ſtrong adheſive plaſter. His breathing was oppreſſed, no doubt, from the air which ſhould have ſerved for reſpiration eſcaping by this hole, without paſſing round the lungs, which have occaſion for a conſtant circulation of air, to heat, attenuate, and ſubtilize the blood, and render it fit for circulation." That this unfortunate apothecary may have had very hypochondriacal feelings, and been at times overcome with the ſenſation of the air paſſing out though his forehead, "et qu'il ſe deſeſperoit de pouvoir vivre long temps avec cet overture," is indeed very poſſible, but that he was hypochondriacal enough to feel and be anxious, and that Palfin had credulity enough to believe him dying for want of air, chiefly becauſe there was an additional hole for inhaling air by, is all that we can learn from ſuch a caſe. No philoſophy, and far leſs this of Palfin's, about the ſubtilizing of the blood, can account for the ill effects of ſuch a hole; for to the lungs and to the blood it ſignifies nothing, if air is but inhaled, whether it comes through the noſtrils, or through the mouth, through an opening

bien il eſt avantageux au chirurgiens, d'avoir une connoiſſance exacte de la ſtructure et de l'uſage de ces ſinus; mais tous chirurgien un peu verſé dans la pratique, ſçaura bien que ces ſortes de playes de tête ne ſont pas d'ordinaire accompagnées de ſymptômes ſi fâcheux, que celles qui donnent iſſuë a la ſubſtancec orticales du cerveau."—*Palfin Anatomie Chirurgicale.*

* Cap. xii. De Vulneribus Capitis.

in the trachea, through a hole in the fore-head, or, if it were poſſible, through a hole in the back-head. The apothecary was more unfortunate in his knowledge and art, than in his ignorance and credulity; for had he left off thoſe tents which were ſo faſhionable in thoſe days, the opening would have cloſed of its own accord. That there is not one word of truth in all theſe reports, one grain of honeſty in the tales of difficulties overcome "*by practitioners of great diſcernment*," I am well ſatisfied, and have read, with no ſmall ſurpriſe, wonderful caſes of numerous perforations, and pieces as big as the palm of the hand cut out by thoſe who never touched the wound with their little finger.

The following caſe is related by Gooch *.

"Profeſſor Monro ſpeaks of a perſon, who, in an engagement with a privateer, received a wound upon the middle of the os frontis; which, although it was ſoon healed apparently, yet left a continual pain of the part. Some time after his return home, the wound broke open, upon which incident the pain abated, but a deep and extenſive caries was found in the bone by the profeſſor, *to whom he applied, after having been under the care of other ſurgeons to no purpoſe.* The carious bone was not black, but of an aſh-colour, and full of ſmall, like worm-eaten holes, and the diſcharge was large, ichorous, and very fœtid. *This practitioner of great diſcernment*, was apprehenſive that the caries penetrated at leaſt as far as the diploe, *about the breadth of the palm of the hand*, which he eaſily raiſed from thence, except in one ſmall ſpace, where he left it to exfoliate; and cured his patient, after this operation, by the common treatment."

Not one word of which is true, ſo help me God! and Profeſſor Monro, who is a man of ſtrict honour, of ſtrong and manly ſenſe, diligent in obſervation, and whoſe good advice I have often profited by, is, I am perſuaded, incapable of relating the caſe thus, either in converſation or in lecture. My worthy maſter, Mr Wood, performed the operation, and I was at the time his apprentice. This gentleman was Captain of a French ſhip, which he defended very gallantly, and in the engagement, which was very cloſe, he received a piſtol-ſhot in the forehead, betwixt the two ſuperciliary ridges. His ſhip was captured in the mouth of the Clyde, and thirty days after he received the wound he was brought to this city. The ball was ſunk in the hollow of the frontal ſinus, and the integuments almoſt cloſed over it; and though the ball could not be diſtinguiſhed by its colour, you

* Surgical Obſervations, p. 269.

could perceive by the probe that ſome foreign body was lodged there. There was no ſuppuration round the ball, no ſhiverings, languor, oppreſſion, nor other ſymptoms of injury of the brain; he was lively, ſpirited, and reſolute, and ſat himſelf down on a pillow, and laid his head with great compoſure betwixt Mr Wood's knees to have the trepan applied, nearly in the ſame poſture in which a dentiſt places his patient, when preparing to draw a tooth. The ſmall and circular wound, or fiſtula, for it was now callous, was enlarged by an inciſion right down the forehead, and to the root of the noſe. The ball was ſeen nitched in betwixt the fractured edges of the bone. There was little bleeding to retard the operation; a crown of the trepan was applied of ſo large a circle as to include the ball and the wounded part of the cranium. A ball driven through a bone is flattened and ragged, and generally fixed under the fractured edges, ſo that no lever nor forceps can poiſe nor pick it out; and generally, as in this caſe, what you ſee projecting from the wound of the bone is but a fourth part of the actual ſize of the ball. The ball and the ſurrounding plate of bone were cut out, and the poſterior part of the ſinus being ſhivered, the ſplinters were ſeen lying flat upon the dura mater, which was neither wounded nor inflamed; theſe were picked away with a ſilver probe, the wound lightly dreſſed, and the gentleman was cured, without one moment of ill health from this formidable ſinus, though both wounded and trepanned.

Ravaton, army-ſurgeon under the warlike reign of Louis XIV. mentions a ſimilar wound in a foot-ſoldier of the regiment of Condé, who was ſhot at the battle of Dettingen, right betwixt the eyes. The wound ſeemed at firſt (ſays Ravaton) full of danger, for the ſoldier aſſured me that the muſket-ball was lodged; and it is difficult to imagine a muſket-ball lodged in a cavity ſo ſmall as that of the frontal ſinus, without breaking the poſterior table, and touching the brain. I believed the ball lodged actually in the brain, (ſays Mr Ravaton); I ſearched with my probe, but found no outlet from the ſinus. At laſt I diſcovered the ball, encruſted and completely flattened, lodged in the loweſt and wideſt part of the frontal ſinus; and I extracted it without either inciſions or trepanning, and along with it ſeven ſplinters of the bone. The wound was dreſſed ſimply with plucked charpie. The ſuppuration began on the fourth day; it ſoon became very profuſe, which was the prelude to the diſcharge of ſome other fragments of bone, which being looſened, the diſcharge leſſened, the wound healed, and the ſinus was cloſed to a very ſmall opening, from which a watery exudation continued to flow, even to the time of his leaving the hoſpital, which was three

months after the battle: here we have another wound not leſs deſperate probably than that of the apothecary of Louvain, followed too by the operation of trepanning, without any want of breath, or danger of dying.

Never having been accuſtomed to indulge theſe irrational fears, I trepanned this ſinus in a caſe of general convulſion, ſingular in all its circumſtances, and not uninſtructive, but eſpecially in this reſpect, that it was plainly connected with a diſeaſe of the frontal ſinus.

"A very tall, well made, and handſome lad, about twenty-four years of age, a houſe-carpenter in Appleby, while aſſiſting his fellow-workmen in laying a heavy beam upon the frame of a ſaw-pit, ſlipped a foot, and falling forwards, had his head immoveably wedged betwixt the beam which they were lifting and that which had juſt been laid upon the frame; and ſo heavy was this log, that his companions were obliged to take their hand-ſpikes and poiſe it up. He cried out during the time his head was wedged between the logs, and when releaſed was able to riſe; though giddy, he was not inſenſible; nor did the blood burſt from his noſe and ears, as might have been expected after ſuch an injury.

"Though his head ſuffered this preſſure on the ſides, being compreſſed from temple to temple, there is every reaſon to believe that the forehead had ſuffered, and the frontal ſinus been injured; for he walked home under the agony of an acute headach, which ſoon, however, ſubſided into a heavy, dull, and continued pain, aggravated at times, but never entirely abſent. His head was confuſed; he gradually loſt his hearing, and by the third week from the time of the injury was entirely deaf; he returned to work, but his headach, giddineſs, and deafneſs, were unremitting, and he had occaſion to remark, that "he never, from the moment of that bruiſe, had a good head for ſtanding or working in any difficult places."

"The ſudden manner in which he regained his hearing, and the profuſe flow of matter from the ears and noſtrils, which opened the paſſages, are very remarkable. It happened about a fortnight after loſing his hearing, that while he was working in the fields, upon blowing his noſe, there ruſhed out from one ear a great quantity of matter, with a painful noiſe. He fell down by the wall in a ſort of fit, lay for ſome time inſenſible, and when his ſenſes returned, he was as much ſurpriſed at hearing the barking of dogs, and the voices of the people in the neighbouring village, as if he had been born deaf. He now found that matter was flowing from the noſtrils, as well as from the ear, with a ſmell ſo offenſive, that at firſt he

imagined that his hat in his fall muſt have lain in ſome foul place. He ſmelt his hat firſt, and looked to it, but found it not ſoiled, nor foul, and upon blowing his noſe, there run out into his handkerchief a profuſion of foul and very fœtid matter, mixed with blood.

" When he had fully recovered his ſenſes, he found that the diſcharge of blood and matter from the noſe was accompanied with agonizing pains in his head; he retired to the ſhelter of an unfurniſhed houſe, where his companions had been working, and threw himſelf down on a bed-frame, and lay there alone till evening, with his head hanging over the bed-frame, a black, fœtid, and bloody matter diſtilling profuſely from his right noſtril, while an acute and confuſed pain ran through his forehead. He got up after ſome hours, and walked to his father's houſe, about a mile diſtant, in great pain and confuſion of head.

" From this time the pain in his forehead was unremitting and ſevere, and when heated at work, it was particularly violent *. This pain at the root of the forehead was aggravated at times to violent paroxyſms; it affected the eye, puffed up the eye-lid, ſwelled the whole ſide of the face and forehead. The diſcharge from the noſe continued very profuſe, and this local diſeaſe, accompanied with general headachs, afflicted him for five years, and a permanent bony ſwelling, marked by a very conſpicuous protuberance of the right eye-brow at the place of the frontal ſinus, was formed.

" But his complaint underwent a ſad revolution in conſequence of a ſecond fall, which happened thus: After mowing hay in weather which was oppreſſively hot, he retired with the other labourers at mid-day, to reſt in the hay-loft; being overcome with labour, and having fallen into a perturbed ſleep, he by ſucceſſive reſtleſs motions got ſo near the edge of the loft, that he at laſt ſlipt over. One of his fellow-labourers chanced at that moment to obſerve him ſliding, and ran to catch him by the feet, but too late, for he fell from the loft headlong, upon a rugged pavement of big round ſtones, and alighted exactly upon that part of the forehead which had been long the ſeat of diſeaſe; for I find the ſcar of the wound which he then received, juſt over the bulging of the right frontal ſinus. He lay inſenſible during a quarter of an hour, and when he revived, he felt ſick, faint, and languid; and his companions being gathered about him, he waved his hand as for room, and

* He recovered, about a fortnight after this, the hearing of his other ear by a like diſcharge of matter, which alſo happened ſuddenly upon blowing his noſe.

a freer breathing-ſpace. They carried him into the open air, where he inſtantly fell into an epileptic fit, which epilepſy has continued ever ſince.

" The epileptic paroxyſms returned frequently, at leaſt every night and morning, from the time of this fall. He was weakly, almoſt paralytic, walked only with the help of ſtilts, and trailed his limbs along. In about five weeks he had ſo far recovered, as to think himſelf ſtrong enough for work, and the paroxyſms, which had at firſt recurred three or four times a-day, became leſs frequent, ceaſed at laſt, and were abſent entirely for a week. Thus encouraged, he returned to his daily labours, and by the violence of his labours the fits came on again. He had been now ſix months labouring under this diſeaſe, is reduced, weakened, and diſpirited; is diſtorted with theſe fits of ſpaſm or convulſion twice a-day at leaſt, and tormented from hour to hour with ſevere threatenings. Fits ſo peculiar, and proceeding from ſo unuſual a cauſe, I think it right to deſcribe with particular care.

" The convulſion is diſtinctly connected with the diſeaſe of the forehead. The approach of each paroxyſm is announced by pain of the forehead, with a ſenſe of fulneſs; firſt his jaw begins to ſhake with a trembling, and convulſive motion, and the tongue, too, trembles, and is retracted into the mouth. This is the warning or firſt alarm of the approaching paroxyſms, which ſometimes, as he imagines, he prevented by clenching the jaws, and holding them firmly. Being once attacked when reading, he, in hopes of ſtopping the convulſion, thruſt the book into his mouth, the convulſion increaſed, and was as uſual propogated along the neck, arm, and ſide; the book was ſo fixed by the convulſion of the jaw, that he had no power to withdraw it, and the ſuffering was ſo dreadful, that he remembers having howled with agony.

" But the convulſion only begins in the jaws, then trembling and convulſive motions run downwards along the neck; his head is turned to the right ſide, while his neck is tortured with the ſpaſm; the convulſion deſcends from the neck down the arm, and to the hand, which is clenched and contracted, till the whole of the right ſide is affected with it.

" Beſides frequent threatenings, and inceſſant fear, he has three or four regular paroxyſms during the day. He is warned of its approach, like thoſe who have the aura epileptica, by ſlight diſtortions of the parts, and a confuſed ſenſation in the forehead; he immediately clings to a bed-poſt, a cheſt of drawers, a door, or ſome firm body, continues ſenſible, and feels all the horror of its ſlow approach, and all

the pains of the convulſion; and the perpetual fear of this attack has given his countenance an anxious, ſubdued, and melancholy caſt. Firſt in orderly ſucceſſion, comes the pain and fulneſs of the forehead, then the tremblings of the jaw and tongue, then the ſore contractions of the neck, which draws his head over the right ſhoulder, and then ſucceſſive cramps and convulſions of all the right ſide of the body, till it is bent down; and in this ſtate of agony he continues four or five minutes, when the muſcles of the ſide of the arm of the neck gradually and ſucceſſively tremble, and fall into a quieſcent ſtate, and the convulſions of the neck and arm having remitted, the ſpaſm of the jaw, and trembling and retraction of the tongue alſo ceaſe, and then he returns ſlowly to his ſeat. He is always in great confuſion, but never inſenſible, during the fits, unleſs it be during the night; for it would appear, that during ſleep he is ſeized with fits more nearly approaching to the nature of true epilepſy. He paſſes his fæces and urine involuntarily during the night. His diſeaſe has, if not the expreſs form, at leaſt the effects of epilepſy; for his faculties begin to fail, his memory is injured, certain words he is unable to pronounce, and pronounces them with a painful and convulſive heſitation. Although he does not actually fall down, his confuſion during a paroxyſm amounts almoſt to inſenſibility, and each paroxyſm is followed by drowſineſs and a degree of oppreſſion, ſo that very commonly he falls aſleep, his right eye is turned obliquely inwards, the ſwelling of the frontal ſinus over it is very prominent, and gives an obliquity to the whole countenance; the matter which runs from the right noſtril only, is in great profuſion, it is partly glairy, partly purulent, amounts to two or three ounces in the day, and ſometimes entirely fills a bleeding palate *. His ſpeech, eſpecially after a paroxyſm, is ſlow, difficult, heſitating, and interrupted. When pain of the forehead comes, and is not followed by convulſions, he has a general feeling of weakneſs, as if all his joints were looſened; he trembles, and his knees ſhake under him, and he has a trembling and paralytic feeling in the arm.

"This is the whole ſtate and condition of this young man, who, from uncommon health, and bodily ſtrength, is reduced to great weakneſs and deſpondency; and ſince the firſt ſigns of the paroxyſm are diſtinctly referable to the frontal ſinus, and ſince the convulſion affects the ſame ſide of the body with the injured part of the head, are removed all ſuſpicions of its ariſing from any diſorder of the brain. I have reſolved, (encouraged and ſupported by the unanimous voice

* Containing from four to five ounces.

of the conſulting ſurgeons), to trepan the ſinus, hoping, by curing this ulcer, to remove a poſſible cauſe of diſorder: The diſmal ſituation, and earneſt intreaties of the patient, are arguments too powerful to be reſiſted; and the operation, though unuſual, is no raſh enterpriſe, but, on the contrary, entirely void of danger.

"I laid open the diſeaſed and much enlarged ſinus with an inciſion of little more than an inch long, and perforated the bone, which was of ſuch thickneſs, that the aſſiſtants believed that I had miſtaken the caſe, and pierced not the outer plate of the ſinus, but the whole thickneſs of the ſcull; and they plainly ſaid, that the membrane now expoſed was not the lining of the ſinus, but the dura mater. But it was merely the lining of the ſinus; the injections paſſed from this ſmall trepan-hole into the throat and noſtrils, and the patient could at pleaſure draw it back again through the trepan-hole. By a little ſkill and practice, and by inclining the head of the patient properly, the dreſſer ſoon learnt to direct his injection, ſo that the whole of it flowed out by the right noſtril. The lad continued under my care for three months, and I injected the ſore firſt with barley-water, then with ſolutions of vinegar and honey, then with tinctures of bark and myrrh, and finally with tinctures of corroſive ſublimate and crude ſal ammoniac; but (as I muſt confeſs) without the ſlighteſt alteration on the matter, (which ran profuſely from the noſtril), or the ſlighteſt improvement of his health: Deſpairing of doing good, and wiſhing that he ſhould leave the precincts of an hoſpital not always healthy, and enjoy his native air and better food, I ſent him home, having firſt withdrawn the tent, and healed the fiſtula, which cloſed ſolidly in two days, and had always been inclined to cloſe. So untrue are all theſe idle tales about the danger of wounds, and the raſhneſs of trepanning this part.

The diſeaſes of this cavity, from blows, from ſcrophula, from inſects drawn in with the breath, are not unfrequent, and are peculiarly ſo in the lower animals, which, in ſeeking and ſmelling out their food on the ground, draw in the eggs of inſects, who neſtle in the ſinus, and produce extreme diſtreſs. Thoſe which neſtle in the ſinus frontalis of the human body, are uſually worms of the centiped kind, ſometimes red, and cloathed with hair, with black and pointed heads. Worms of this kind are deſcribed in Mr Hill's Caſes, in the Edinburgh Medical Eſſays, in Linnæus, and in many foreign journals. And ſo frequent are they, that often worms are ſuſpected in caſes of ſimple diſeaſe of the bone itſelf, the only affection of the part which I have at preſent even an apology for explaining. The following caſe is ſo purely a diſeaſe of the bone, it has ſo many peculiar features to mark its nature, and bear ſo

clofe an analogy to that which I have juft related, that I cannot refrain from giving this brief extract from my private books.

" Mr P——, a man certainly of a fcrophulous temperament, weakly health, and fallow countenance, and who has lived a fedentary life; was, when a boy at fchool, (though healthy, ftrong, and active), attacked with a fpontaneous difeafe of the os humeri, which kept him in mifery for feveral years, the moft precious in his life for attaining ftrong and confirmed health. This difeafe was, I faid, fpontaneous, becaufe, though the furgeon's anxious inquiries about the caufe, and his violent exercifes with his play-mates, induced him to fay, that perhaps he had hurt his arm in throwing ftones, yet he never was, at any particular moment, confcious of a hurt, and the difeafe was juft the common fcrophulous necrofis, affecting almoft the whole fhaft of the os humeri.

" He was a vigorous rambling boy, about twelve years of age, when he was ftruck rather fuddenly with this pain in the arm. Under the impreffion of the part being hurt, a bandage was applied, which the furgeon was foon obliged to undo, on account of the great fwelling and increafing pain. After this pain had continued for ten or twelve days, fo excruciating that he enjoyed no reft nor fleep, a fmall boil appeared above the middle of the arm, and the fluctuation of matter being foon diftinctly felt, a poultice was applied, the boil burft, and there iffued from it a thin and fanious *ichor;* nor did this fore ceafe to difcharge for five years.

" During the continuance of this fore, many profeffional gentlemen were confulted, by whofe advice Mr P. paffed two feafons at Leith, for the benefit of fea-bathing, and at laft betook himfelf to Moffat, where the furgeons, examining the finus with a probe, felt the caries of the bone, and predicted that it would exfoliate, and he fhould get well. He drank of the mineral well every morning, and bathed once a-week, and in no long time the prognoftics of his medical friends were fulfilled; for, after the difcharge of fome leffer exfoliations, a carious bone began to protrude through the opening, fix inches long and three-fourths of an inch in breadth, but was not difengaged till a year and a half after it firft appeared, at which period he had attained his 17th year; he difengaged the bone one morning in pulling and fhaking it, which had been his daily amufement, and, immediately after the carious bone was removed, the ulcer clofed, but with a very fenfible weaknefs of the arm.

" For ten years Mr P. continued to enjoy uninterrupted health, except that he was, during every fpring and fummer, affected with a cutaneous eruption; but in his 26th

year, when attending the Univerſity of Edinburgh, there was an interval during which he was very weakly, languid, and diſpirited. Being adviſed by his friend Dr Anderſon * to retire to the country, he did ſo with great benefit to his general health. This eruption, of a very anomalous character, ſometimes ſuſpected to be an itch, ſometimes ſibbeus, ſometimes regarded as a ſcrophulous diſeaſe, at others as an eruption proceeding from the heat of the ſeaſon, he was entirely cured of, by a ſenſible and intelligent country-ſurgeon, uſing decoctions, probably of the woods.

" After this, he recovered his health and ſtrength, and was in good plight, when ſuddenly one morning he was ſeized with a pain ſo outrageous, as almoſt to drive him diſtracted; the extreme pain in one ſpot, the bump of the frontal ſinus, extending through the whole head: He became deaf, and the hair of his forehead fell off, but the pain ſoon ſettled diſtinctly in the place of the frontal ſinus; and, after about a month or ſix weeks of this diſtreſs, there flowed every morning regularly a quantity of matter from his noſtrils, extremely fætid, ſo that he could not endure it, and attended with ſo much pain, as almoſt bereft him of his ſenſes; he felt as if his forehead would burſt aſunder. At firſt, theſe complaints were preſcribed for by Mr Willſon, apothecary in Glaſgow, who gave him large doſes of phyſic, and certain drops to take, but without relief. He next requeſted Dr Jeffrey's advice, the profeſſor of anatomy, who, probably ſuſpecting that ſome inſect, lodging in the ſinus, might be the cauſe of this diſtreſs, gave him an oil to be dropped into his noſtril three times a-day, and a mercurial powder, of which a little was to be laid upon a hot iron, and the fumes ſnuffed up the noſtrils.

" A year after theſe ineffectual conſultations, and when he had juſt attained his thirtieth year, he again took advice, and was directed to have a ſeton put in the nape of the neck, which both alleviated the pain, and conſiderably leſſened the quantity of matter; but, when the cord gradually cut itſelf out, the matter gradually increaſed in quantity.

" Two years did he endure this miſery, deſpairing of relief, and aſking no advice; but the pain increaſing in September 1800, he conſulted Dr Cleghorn, who ordered him to uſe fumigations, nearly ſimilar to thoſe which Dr Jeffrey preſcribed, and certain purging medicines, which were infuſed every night in boiling water, and

* The biographer, a man of the moſt amiable diſpoſitions, and the warmeſt heart, whoſe talents are too well known to require ſo tranſient a compliment as any thing mentioned in this place muſt be.

taken duly in the morning; and from thefe he found his pains fenfibly alleviated, though he grew weaker daily.

" About a year and a half after this, his noftrils were examined, with the hopes of difcovering fome caufe for fuch intenfe pains, and fo profufe a difcharge; and the report of the gentlemen confulted was, that two polypi occupied the upper part of the noftrils, which muft be extracted. An operation was performed without delay. About two months after this operation, Mr P. obferved, when walking in the fields, a fmall quantity of clotted blood mixed with the difcharge from the noftrils, and on every exacerbation of pain this appearance was renewed.

" His condition was very hopelefs, when, in Auguft 1802, he ufed a courfe of mercury for two months, but forfook it as foon as he found it was difapproved by Dr Jeffrey; it was, he fays, in the year 1803, in the 37th year of his age, that the fwelling of the forehead firft appeared. This was the period in which he firft confulted me; but I judged, that the tumor, though it might have attracted his attention but lately, could not be of recent date; it feemed to me a difeafe, and a long confirmed one, of the frontal finus.

" The tumour was moft confpicuous, and was a remarkable deformity, rifing exactly at the root or fetting off of the nofe, occupying the whole fpace betwixt the eyebrows, feparating them, extending two inches and a half up the forehead, and then gradually declining to the general level of the os frontis. A careful examination of the tumour convinced me, that the bone was greatly enlarged, that the walls or bony plates of the finus were widely feparated from each other, and probably thickened, while a fofter and puffy tumour of the integuments covered the bony fwelling. Perfectly perfuaded, from the profufion of matter which I faw flowing from his noftrils, that this was a great abfcefs of the frontal finus, and aware that the evacuation of matter through the natural opening of the finus into the nofe muft be flow and difficult, efpecially if polypi really did obftruct the upper parts of the noftril, I forefaw no danger equal to that of the difeafe of the bone, extending through its inner table to the brain, and had no fear but of the matter being obftructed, and the abfcefs enlarged. Satisfied that the patient fhould not a moment delay the having this abfcefs opened, by cutting the integuments, and trepanning the finus, I fent him home with this advice. Soon after his return home, from the heat of travelling, or the natural progrefs of the difeafe, his forehead fuppurated fpontaneoufly, which faved his medical attendants from the imaginary dangers of an operation, which, in a cafe fo decided, could have done nothing but good. His own

report, in a letter to his good friend Dr Anderſon, will beſt explain the ſequel of his caſe.

" A ſhort while after Mr John Bell ſaw me, my brow became painful, red, and tumid. This affection chiefly occupied the ſpace above my noſe, and along the courſe of the right eye-brow. The ſymptoms gradually increaſed for ſeveral days, and the pain became intolerable, occaſioning general diſorder of my whole body. At length the exiſtence of matter became evident, and an inciſion was recommended. The tumor was moſt prominent above the root of the noſe, and a perpendicular inciſion was there made, about three quarters of an inch in length; nearly two ounces of matter were diſcharged, unhealthy neither in ſmell nor appearance; a tent was introduced to preſerve the opening, and it was propoſed to examine the abſceſs afterwards. This was done by Mr Cooper ſurgeon, and by Dr Jeffrey, ſeparately. The cavity was found to extend upwards, and towards the right ſide from the opening. The frontal bone was found denuded to a conſiderable extent, and in one place, immediately under the external opening, a conſiderable portion of the external table had given way, and the probe paſſed eaſily into the frontal ſinus. No air, however, could be blown from the noſe through the external opening, and there was now very little diſcharge from the noſtrils. No looſe bones could be perceived; the inciſion continues to diſcharge a ſmall quantity of matter, of a thick conſiſtence, brown, and ſomewhat fætid. My general health is now, however, reſtored. I go about my uſual occupations, and ſuffer little inconvenience.

" Dr Jeffrey thinks the inciſion ſhould be enlarged, to afford a better opportunity of examining it, and to allow means to be uſed for facilitating the proceſs of exfoliation. Mr Cooper is of opinion, that the operation recommended by Mr Bell has been accompliſhed by the progreſs of the diſeaſe itſelf, no farther interference can be neceſſary; and that no advantage could be obtained from a larger inciſion. Dr Jeffrey, not being in the way of operation, recommended Mr Bell in the higheſt terms as the perſon moſt fit to perform the operation *.

" I hope, dear Sir, you will be ſo good as ſhew this account to Mr Bell, and learn his opinion with regard to the plan I ſhould purſue, and aſk him whether he thinks it right that I ſhould come to Edinburgh, to afford him an opportunity of

* I do not feel that there is any true modeſty in ſuppreſſing the partial ſuffrages of a friend whom I am ſo proud to acknowledge. Perhaps I am not even entitled to ſpeak of this as proceeding from partiality; Dr Jeffrey was probably informed of my having ſome years before trepanned the frontal ſinus in ſimilar circumſtances.

examining it, and remain under his care.—Write me as ſoon as poſſible, and add this obligation to the many favours, &c.——"

I adhere, in this caſe, to the opinion of Mr Cooper; for, though I am perſuaded that all ſuch tumours ſhould be opened early, yet it ſhould ever be with a ſparing hand. I adviſed that this ſore ſhould be lightly dreſſed, and little diſturbed; and, to my great ſatisfaction, I ſaw Mr P. on my return through Glaſgow in the year 1803, in Autumn, with an opening drawing towards a cicatrice; a ſmall black patch covered all that remained. He had recovered his health, his fleſh, and ſpirits; he was happy and eaſy, for the headachs had almoſt ceaſed, little matter flowed from the noſe, and there was the moſt flattering proſpects of a perfect cure *.

I am not conſcious of any improper digreſſion in explaining thus fully the only important part of the anatomy of the ſcull; and I now return to my ſubject, and ſhall ſay a few words in concluſion upon the intereſting and curious art of DISCOVERING FRACTURES; nor is my propoſed criticiſm without its object. The art of diſcovering fractures was cultivated, there is no doubt, by phyſicians and ſcholaſtic anatomiſts, who knew no uſeful applications of their ſcience, who, by all the dignities of their profeſſion, were excluded from operations except as ſpectators, and who ſat mopping and ruminating over the bare anatomy of the ſcull: But they have been adopted by practical ſurgeons, and many a time have I ſeen this ſcraping of the ſcull to diſcover capillary fractures, and witneſſed the exultation with which any fiſſure was diſcovered, which might ſerve as an apology for applying the trepan. Theſe ingenious and trivial obſervations, once adopted into the ſcience, left no room for ſenſible or ſerious thoughts; the mind of the pupil was impreſſed, from the period of his very firſt leſſons, with this belief, that wherever there was found even the ſlighteſt fiſſure, there the trepan ſhould be applied. The operation of trepan ſeemed the greateſt, the moſt important, the moſt neceſſary work of the ſurgeon, and, in performing it, he lay under no reſtraint but that of miſtaking a future for

* I have again ſeen Mr P. at the diſtance of a year from this report. I find the outer table of the ſcull at this part entirely gone, the ſkin and the remains of the outer plate conſolidated with the inner plate, and forming a remarkable hollow. The parts ſeem to be ſolidly united, and there ſeems little danger of a continued caries, or of any ſuch internal ulcer, as might affect the Oethmoid bone, or reach the brain. Except occaſional twitches of ſomething like toothach, Mr P. has no pain. He has no megrims or internal headach. The matter which ſtill continues to flow from the noſtrils, is ſmall in quantity, and is merely mucus. A few weeks ago, he was ſenſible that the matter had become thinner, and changed to that brown colour which forebodes the diſcharge of ſome ſcale of blackened and carious bone; but the diſcharge is again become thick, and is plainly mucus.

a fracture, and feared no danger, but that of performing it ill, of injuring the dura mater, of wounding ſome great veſſel, of perforating the frontal ſinus, or of encountering ſome ridge of bone.

In hiſtories of caſes, no expreſſions are more frequent than theſe, "We ſuſpected a fracture," "we at laſt diſcovered a fracture," "we found a fracture on diſſection, which ſhewed the propriety of applying the trepan." But ſurely no expreſſions can be more dangerous nor miſplaced, nor can any thing be more improper than teaching in elementary books, in books containing the mere rudiments of the profeſſion, and which, being firſt read, make indelible impreſſions upon the pupil's mind, the complete art of diſcovering fractures of the ſcull, as if that were the ſole motive for uſing the trepan.

It is to learning that I aſcribe the ſlow progreſs of real ſcience, and to Hippocrates, the father, as he is named, of phyſic, that I refer thoſe idle obſervations which have all along miſguided ſurgeons. The ſubtile genius of the Greek enabled him to invent and multiply diſtinctions and names, to which, of all his commentators, no one has been able to add any thing new. His book, De Vulneribus Capitis, is not, as you might imagine, a book of prognoſtics, but a book about fractures, and the diſtinction of fractures. He is the author of many of theſe prejudices which now paſs current for ſound practical rules: "Longe majus malum recipit, (ſays Hippocrates), qui in oſſe in ſuturas telum recipit, quam qui non in ſuturas id recipit. Et pleraque horum perforare oportet. Verum ipſas ſuturas perforare nonoportet, ſed ſecedendo in propinquo oſſe perforationem facere, ſi perfores." Thus was eſtabliſhed (and what Hippocrates ſaid was never neglected) the firſt great diſtinction of trepanning fiſſures, and avoiding ſutures; and theſe ſort of diſtinctions and rules, the more they were commented upon, became, of courſe, the more conſpicuouſly abſurd: "The more brittle the bone is, (ſays Muſitani), the more apt to be fiſſured; the ſofter, the more apt to be depreſſed." "Some diſtinguiſh a chink from a fiſſure, and give a fracture the ſame relation to a chink, that a depreſſion has to a fiſſure. But there are beſides four principal diſtinctions of a chink, according to its wideneſs or narrowneſs, its length or ſhortneſs, its ſtraight or curved direction, according as it is ſuperficial or deep *."

* XVI. de Capitis Vulneribus.

* Quanto oſſa duriora ſunt, tanto aptiora ad rimam contrahendam; et quanto molliorem ad contuſionem aptiora ſunt. Sunt, tamen, qui rimam a fiſſura diſtinguent, et ſub rima fracturam, ſub fiſſura ſedem, comprehendunt. Rimarum autem rurſus quatuor præcipue ſunt differentiæ a latitudine vel anguſtia; a longitudine et brevitate; a ſuperficie et profunditate, deſumptæ.—Muſitani, p. 143.

Theſe obſervations of Muſitani are excellent in their kind, fully as wiſe as thoſe of his fellow-commentators. From ſuch diſtinctions, taken from the length, breadth, or depth of fractures, fiſſures, and depreſſions, what could be inferred uſeful to the ſurgeon? So abſurd were the labours of theſe learned men, that even Garengeot was amuſed with their occupations; "it hath pleaſed the ancients (ſays he) to give high-ſounding names to all varieties of fractures, ſo that I will give the moſt experienced ſurgeon, the man who has ſtudied theſe diſtinctions the moſt diligently, fifteen days to learn and repeat their names *. It was in theſe days that ſo much was ſaid about counter-fiſſures, about the brittle texture of the inner table, the tabula vitrea, and of its often giving way, while the external table remained entire."

It was eaſy to perceive the natural inevitable iſſue of ſuch inquiries, and to foretell that this care and concern about the forms and depth of fractures would lead to the frequent uſe of the trepan; this, indeed, was the practice from the earlieſt times, long before the days of Celſus, who ſays, "In omni vero fiſſo fractove oſſe, protinus antiquiores medici ad ferramento veniebant, quibus id exciderent †." In every fracture, fiſſure, rhogme, or almoſt inviſible crevice, it was accounted the duty of the phyſician to have recourſe to inſtruments: This extravagant opinion, received on the authority of Hippocrates, was enforced in the writings of the credulous Van Swieten, and in the commentaries of Paw, the indefatigable Dutch expoſitor ‡. "Trichiſmus, (ſays Hippocrates), the moſt minute and leaſt diſcernible of all fiſſures, is, for that reaſon alone, the moſt frequently mortal ‖." "All ſkilful ſurgeons and phyſicians agree (ſays Van Swieten) in this, that a fiſſure of the ſcull is often attended with much more danger than a violent contuſion, or even fracture of its bones, for a fiſſure is more *difficult* to *diſcover*, and often eſcapes the *ſtrickeſt examination*, till it is too late," &c. § Fiſſure or fracture, or ſome inviſible damage

* Il a plû aux anciens de donner des grands noms aux fractures du crâne, noms qui ne ſerve qu' à embaraſſer, noms que les plus experimenté chirurgien, et celui qui les a le mieux appris, ne repetteroit pas au bout de quinze jour."—p. 114. vol. 3.

† Liber viii. cap. iv.

‡ "Nolent itaque chirurgi, majores potentioreſque fiſſuras, anguſtis minus eſſe debere ſuſpectas."—*Paw de Oſſibus*, p. 82.

‖ Eſt autem trichiſmus, arctiſſima rhogme, ſenſuum plerumque fallens, eoque latens; quæ, quia non facile ſe oſtendit, mortis cauſam ſæpe adfert.—Hippoc. de Vuln. Cap.

§ Van Swieten, vol. ii. p. 367.

to the bone, was the ſole danger they feared, the ſole motive or apology for perforating the ſcull: For the raſh imprudent uſe of inſtruments, the ſurgeon was never blamed, but for its omiſſion only; and, if a patient died untrepanned, who was found after death to have but the ſlighteſt fiſſure in any part of the cranium, within or without, it was thought that he had not come fairly by his death. With various ſhaped irons they not only ſcraped the fiſſure, ſo as to widen it, but, when there was ſuſpicion of any thing wrong, they ſcraped till they got through both tables of the ſcull, in ſearch of whatever might offend the dura mater. "Thus, (ſays Fallopius, in his Commentary on Hippocrates), it happened in a young man, a ſtudent, who was wounded on the head with a very heavy ſword, but without the ſmalleſt chink or viſible fiſſure, that it came, God knows how, into my head, that I ought to go down through the firſt table at leaſt to the diploe, (neſcio quomodo factum ſit ut voluerim deſcendere in meditullium); but having by ſcraping got through the outer, and reached the inner table of the ſcull, I there found a wide and very remarkable fiſſure."—Yet it ſounds much like affectation in Fallopius to ſay, that he knew not what motives fortunately induced him to go down to the inner table: the ſurgeons of thoſe days never were guilty in that confeſſion of the Litany, which ſays, "We have left undone thoſe things which we ſhould have done:" they left no poſſible thing undone: it was the univerſal practice to raſp the ſcull wherever the ſlighteſt fiſſure appeared; and it was the particular precept of Fallopius himſelf, expreſſed in theſe words: "Cum ergo magnum ſeſe nobis offert vulnus, abradite uſque ad interiorem laminam *."

So eager were they to diſcover fiſſures, that there is every reaſon to believe that they not unfrequently miſtook the furrows of the arteries for fractures of the ſcull. "I do not preciſely remember (ſays Saviard) at what time it was that I was called into the Faux-bourg Saint Lazare, to viſit a little girl, who, having fallen into a well, had one of the parietal bones laid bare to the breadth of a crown; and the ſurgeon, having obſerved one of thoſe ſlight furrows or impreſſions made by the arteries of the ſcalp, and miſtaking it for a fracture, had declared to the parents that the trepan muſt be forthwith applied. The parents, not daring to refuſe their conſent, had ſent for me to aſſiſt at the operation, and to give the uſe of my inſtruments, which I granted moſt willingly. But the moment I examined the bone, and was conſcious of the miſtake of the ſurgeon, I carried him aſide, perſuaded him that there was no fracture, and that it would be unprincipled to operate, having this conſciouſneſs. However, to exculpate him from the

* Cap. 13.

ſuſpicion of raſhneſs, I ſaid to the parents, that this fracture, being capillary only, we ſhould content ourſelves for the preſent with applying the rugine to aſcertain its depth. I made him, in order to give a colour to this apology, draw the rugine in a harmleſs way along the courſe of the fracture, ſaying in the time to the aſſiſtants, that it did not ſeem to me to penetrate, at leaſt not deep. Thus the ſurgeon was acquitted, and the patient ſaved from a dangerous operation ¶.

Theſe accurate obſervers of the anatomy of the ſcull remarked, that a ſuture was ſmoother than a fiſſure ;—that a natural ſuture was wſerrated, while a fiſſure ran always in a ſtraight line ;—that a ſuture was covered and cloſed with its perioſteum, while a fiſſure was not ſo, but admitted the blood into the chink ſo as to diſcolour it ; and thence they fell upon the admirable invention of pouring ink upon the ſcull, which, by ſinking into the ſlighteſt fiſſure, might diſcover it.

Who has the firſt honour of this invention, is far beyond the reach of enquiry, for it is mentioned by Hippocrates * ; but though he is the firſt that directs the uſe of the *nigra medicamenta ;* though after-writers, and Celſus eſpecially, have had the ingenuity to ſubſtitute the *atramentum ſcriptorium* †, yet Guillemeau alone had the wiſdom to remark the diſmal conſequences which might ariſe from ſuch a peſtilent infuſion of galls and vitriol upon the brain, and earneſtly inſiſts upon the ſcull being rather daubed with *printers' ink.* But, as Celſus could not foreſee that his books were to be *printed*, he is pardonable for uſing the ink he had ; which by the by was not much different from printers' ink. Other inventions followed ſtill more ingenious ; they had leaden hammers ‡ for ringing the ſuſpected cranium with, as you would try damaged crokery with the finger. " Pulſu, dignoſcere

* His ita contingentibus, ſi non cognoſcas aut os ruptura ſit, aut contuſum, aut ambo hæc, neque alias videas : ſuper os aliquid maximi nigri coloris, nigro medicamento liquato ſubactum imponere oportet.—*Hippocrates.*

† " At ſi tam quidem rima manifeſta eſt, deinde id ſcalpro detrahendum, nigritiem enim ſi quid fiſſura eſt." —*Celſus*, lib. viii. cap. iv. p. 373.—18.

‡ " Item percutiatur caput cum levi bacculo ſicco, de ſalice aut de pino, et pone auram tuam apud caput ; et ſi ſanum eſt, tunc audies ſonum ſanum ; ſi fractum aut ſciſſum, audies ſonum mutum."—*Lanfranc.*

¶ Il ne me ſouvient pas bien du temps ou je fus appellé en conſultation au Fauxbourg Saint Lazare, pour une fille qui étoit tombée dans un puits aprés ſonſeau, et à laquelle le bord de ce ſeau avoit découvert un des os parietaux de la grandeur d'un écu blanc. Le Chirurgien qui l'avoit panſée, ayant remarqué ſur l'os découvert une de ces impreſſions legeres ou petites caneures qu'y ſont d'ordinaire les arterioles qui ſe gliſſent dans leur ſubſtance ; et la prenant pour une fracture, avoit prévenu les parens de cette bleſſée de la neceſſité du trépan, pour la mettre à couvert des accidens qui ſurviennent aux fractures du crane.

Les parens ayant conſenti à ce qu'il voulut leur inſinuer, il vint me prier de le venir aſſiſter de mon conſeil

cautus, quid ſolidum crepet *." They gave the patient a cord or wire to hold betwixt his teeth, that when ſtruck it might produce a jarring ſenſation in the fractured part; ſo anxious were they to diſcover a fracture, even when the patient was in his perfect ſenſes, that they ſometimes deſired him to chew a key, or a bit of hard wood. Theſe inventions need no comment; there is one thing, however, which may with propriety be added: "Nonnulli præcipiunt (ſays Fabricius) ægro ut dentibus frangat amygdalam aut nucem avellanem." "Some direct that the patient crack almonds or walnuts with his grinders." If the writers of ſurgical ſyſtems would but condeſcend to add this to their other methods, they would put the whole buſineſs in its true light.

Though I have ſeen many a painful and fruitleſs ſearch for fiſſures, I confeſs I never have ſeen the cranium,—virga percuſſa ut ederet ſonum. And though I have read much about this ringing of the cranium, I never had fallen upon any paſſage in which the author affirmed that he had heard ſuch a ſound, till I read the following in Foreſtus, whoſe learning, titles, and dignity, are a ſufficient apology for what he may ſay upon ſuch an occaſion: "A ſoni conſideratione dignoſcere poſſis, quia rauce ſonat dum ejus caput percutitur cum virga: *imo ego ſæpius animadverti admota aure, vulneratam tanquam ex olla confracta locutum fuiſſe* †."

From the influence of all ſuch ſurgical obſervations: I hope I have delivered you from the theories of an age ill qualified to give leſſons in our art, ſince they knew not how even to amputate a limb with ſafety: From the dreams and fictions of the cloſet, contrived by profeſſors and phyſicians little converſant with our art, and handed down as important precepts to ſurgeons, at a time when ſurgeons were men of no eſtimation. Theſe obſervations formed one entire and conſiſtent ſyſtem, of

pour cette operation, et de luy prêter mon trépan, ce que je fis volontiers: Mais lorſque j'eus examiné la ſurface de l'os, et connu la mépriſe; je le tiray à l'ecart, et luy fis connoitre que n'y ayant point de fracture à l'os, ny d'accidens qui demandaſſent l'operation, il n'étoit pas juſte de la faire inutilement: cependant pour le diſculper ſur le jugement qu'il avoit fait avec trop de precipitation, je dis que la fracture n'etant que capillaire, et les accidens n'etant point trop preſſans, nous nous contenterions pour ce jour-là de ruginer l'os ſur la fracture pour mieux juger de ſa profondeur.

Je luy fis donc donner ſur l'os quelques coups de rugine fort legerement et ſeulement pour la forme, puis ayant dit aux aſſiſtans qu'il ne me paroiſſoit pas que cette fente penetrat beaucoup, le chirurgien ſe trouva diſculpé; et la bleſſée quitte d'une operation qui luy auroit fait plus de mal que de bien, ſoit en frappant doucemeut ſon imagination ſur la grandeur de ſa bleſſure, ſoit en retardant conſiderablement la gueriſon de ſa playe, qui ne tarda gueres à guerir apres une legere exfoliation de l'os.

Il paroit par l'expoſition de ce fait, que les chirurgiens peuvent quelquefois faire des operations inutiles, qu'ils croient tres-neceſſaires, faute d'avoir les lumieres que leur pourroit l'anatomie, pour bien juger de l'etat des parties du corps, tant naturel que contre nature.

* Perſius. † Foreſti Obſ. Chirurg. p. 97.

which a fondneſs for operation was the natural conſequence, and it is my profeſſed wiſh, and my duty, to impreſs this truth upon your minds, "That all the knowledge of ancient and of modern ſpeculators derived from the anatomy of the ſcull, cannot furniſh forth one uſeful rule, ſince it relates merely to fractures of the cranium, not to injuries of the brain." In plucking up, perhaps, too carefully this rank overgrowth, I hope and believe that I have ſown the ſeeds of uſeful knowledge, and will truſt to your forbearance and partiality not to be fatigued with the length of the narrative.

"Diſce———cum veteres avias, tibi, de pulmone revello."

At our next meeting, I ſhall be employed in delivering doctrines of a very different complexion; not in repeating theſe idle diſtinctions of fractures, fiſſures, depreſſions, and depreſſed fractures, but in deſcribing the bones of the cranium, as part of a living ſyſtem, endowed with circulation and ſenſibility, and liable to every kind of diſeaſe that affects the ſoft parts:—In explaining to you the various injuries of the bone, of which fracture is the leaſt important:—In proving to you how much the cranium depends for nouriſhment on its inveſting membranes, the perioſteum, and dura mater;—how the ſeparation of theſe by a blow, or how the ſhock which the bone itſelf receives, may occaſion its death, whence ariſe ſuppurations of the dura mater, and ulceration of the brain. It is not the apparent and obvious danger, the fracture or fiſſure of the ſcull, that we have moſt to dread, (though the fracture is no doubt a mark of violence, and therefore of danger), but that imperceptible injury which is to be evinced only by future and remote conſequences.

The opinions and precepts which I have held up to your contempt, are thoſe of a country, which excelled in the fine arts; but the man who excelled all others in natural ſcience, or rather in the means of attaining truth, has taught me not to ſhrink from this duty; and, in his vigorous and maſculine words, ſhall I make my apology, for whatever may ſeem too boldly done: "Nam ſi quis in omnem illam librorum varietatem, qua artes et ſcientiæ exſultant, diligentius introſpiciat, ubique inveniet ejuſdem rei repetitiones infinitas, tractandi modis diverſas, inventione præoccupatas; ut omnia primo intuitu numeroſa, facto examine pauca reperiantur. Et de utilitate dicendum eſt; ſapientiam iſtam quam à Græcis potiſſimum hauſimus, pueritiam quandam ſcientiæ videri, atque habere quod proprium eſt puerorum; ut ad garriendum prompta, ad generandum invalida et immatura ſit."

DISCOURSE II.

OF THE PATHOLOGY OF THE INTEGUMENTS, SCULL, AND DURA MATER.

I BELIEVE I have proved to you, in my laſt diſcourſe, that the ſtudy of the ſutures, the diploe, the holes and proceſſes, the thickneſs and thinneſs of the ſcull, begat a dangerous ſpirit of enterpriſe, taught the young ſurgeons to think f operations, of nothing but operations, and led naturally to a harſh and unrelenting practice; and you are now aware of this important truth, that the rules of our art are no more to be deduced from the external forms of the ſcull, than the philoſophy of the human intellect from the ſhape of the convolutions, cavities, and proceſſes of the brain.

That fractures of the ſcull, the moſt alarming and ugly fractures, are attended with leſs danger than the ſlighteſt accidents, (which lead to ſuppuration of the brain), I ſhall prove to you at another time; and I ſhall begin now to unfold the true theory of theſe injuries of the brain, by explaining, not the outward form of the ſcull, and the anatomy of its ſeveral bones, but the internal organization, the living powers, the ſuſceptibility of injury, and the ſympathy one with another of the pericranium, the ſcull, and dura mater:—theſe are the integuments of the brain, and from the ſlighteſt injury of the moſt remote of theſe, there often enſues, ſlowly, imperceptibly, and at a diſtant and unſuſpected period, ſuppuration of the brain itſelf. Life is endangered more frequent-

ly by a laceration of the integuments, or by mere contuſion of the ſcull, or by an imperceptible ſeparation of the dura mater, than by the wideſt fractures. Now, the proofs of this conſiſt in facts, which even in their ſimple detail, though not connected by theory, nor recommended by any ingenious explanation, would be of themſelves uſeful: but the mutual dependence of the ſcalp, the ſcull, and the dura mater, is ſo clearly made out by innumerable practical examples; the progreſs of diſeaſe, from a ſlight puffy tumor of the ſcalp, to a fatal ſuppuration of the dura mater, is ſo plainly traced; the ſlow but undeviating progreſs of fatal ſigns, from the firſt nauſea, and ſlight tremblings of the hands and tongue, to the fatal convulſions, is ſo eaſily traced, and forms ſo intereſting a ſubject for judicious prognoſtics, and ſenſible and manly practice, that I know not in the circle of our profeſſion a piece of pathology more intelligible, nor a ſubject of inquiry more eaſily proſecuted, to ſure and intereſting concluſions. And we have this encouragement to conſider the pathology in place of the anatomy of the ſcull, as the rule of our prognoſtics, that while anatomy, and the enumeration and claſſification of fractures, has led to an undue propenſity to operation, the ſtudy of the living powers, and mutual dependence of theſe parts, leads to a reſerved, modeſt, and rational practice,—to a juſt confidence in the powers of nature,—to a careful and ſolicitous attention to all the inſidious ſymptoms of ſuppurating brain.

We have much reaſon to guard againſt deceptions ſo natural, ſo pardonable, as thoſe which enter into the vulgar belief concerning the nature of bone. Bone is defined according to its obvious and uſeful properties; and theſe are, its ſtrength, its hardneſs, and firmneſs, its capability of ſupporting the ſofter parts, to which it ſeems altogether diſſimilar. A bone is laid upon the anatomiſt's table, dry and bare, and deprived of all its natural connections, and he diſcourſes only on its inanimate properties of ſtrength and firmneſs; or on its holes and proceſſes, and external forms; or on its relation to the ſofter parts, as affording them ſupport, or proliction; but never on its having one common nature with them. He even miſtakes the moſt obvious circumſtances of the ſtructure of bone; ſeeing a cellular ſubſtance, full of blood-veſſels, pouring out blood profuſely, when wounded in the living body, and deſtined, moſt obviouſly, like the cellular ſubſtance of ſoft parts, for the growth and perpetual nouriſhment of the bone, he deſcribes it as a cavity full of cancelli, which are occupied merely with fat or oil, to lubricate the bone, and prevent its becoming fragile.

Bone is by nature ſo different from the other parts of the body, ſo perfectly firm, ſo colourleſs, and apparently inſulated, that we forget to think of it as conſtituted

like the other parts, as living by the ſame circulating blood, or as ſubject to the ſame diſeaſes. Bone, though extremely vaſcular, has yet ſo little appearance of blood, that its circulation and living powers are demonſtrable only by the moſt ſubtle injections, or to be inferred from particular facts. Bone lives by a ſyſtem of veſſels ſo peculiar to that form of animal matter, that when broken, lacerated, or any way thrown into unuſual action, thoſe veſſels ſecrete only bone, which, in the caſe of wounds, or fractures, re-unites the broken parts; in caſe of necroſis, (*i. e.* mortification), regenerates the bone; in caſe of diſeaſe, produces tumor; and all this ſeems ſo diſtinct from the ſecretions performed by veſſels in all other parts of the body, and is a proceſs ſo little dependent on ſurrounding fleſh and membranes, that the vulgar muſt inevitably judge of bone as no other within the body, than that dead ſubſtance which they ſee and handle out of the body; in ſhort, as a firm and peculiar concrete, deſtined to ſupport the ſoft parts. The learned partake of this prejudice. The living powers and properties of this part of the ſyſtem are not always preſent to our imagination, and it is only when called upon, (as frequeutly we are by accidents and the various conſequences reſulting from its diſeaſe), to recollect its organization, that we reaſon according to the analogy of the ſofter parts.

The ſcull is a living bone, defending the moſt important organ of the body, whoſe ſlighteſt injury, through the medium of its inveſtigating membrane, draws after it the moſt diſmal conſequences. When the ſcalp is bruiſed,—when the dura mater is violently ſeparated by a ſhock,—when the ſcull itſelf is deadened by a heavy blow, ſo as to loſe its circulation, and be no longer able to ſupport its connection with the ſurrounding parts,—a puffy tumor ariſes externally, while the brain is undergoing a ſlow ulceration within. The outward marks of injury ſeem trivial, the ſigns of internal danger are ſlight; yet there is no danger ariſing from injuries of the head ſo inſidious, no cauſe of death ſo inevitable, as that which follows ſuch a blow. Although the ſympathy of theſe ſeveral teguments of the brain, of which we are prepared to regard the ſcull as by no means the moſt important, ſeems merely a ſubject of ſpeculation hypothetical in its nature; yet does the inquiry lead to the ſureſt prognoſtics, and to the moſt incontrovertible rules of practice; becauſe the proofs of this ſympathy are founded on the obſervation of cauſes, ſlow in their operation, obvious to every ſenſe, terrible in their conſequences, and aſcertained by frequent diſſections of thoſe who die.

Till of late years, anatomiſts were utterly ignorant of the nature of bone. "A young Ruſſian nobleman, of the name of Buterline, was, in a ſkirmiſh with the Tartars, wounded ſo cruelly, that a portion of the ſcalp, ſcull, and all was car-

ried clean away by the ſtroke of a ſabre. The ſurgeon having killed a dog, cut out a portion of its ſcull, correſponding with that which in this nobleman had been cut off with the ſabre, nitched it into the wound, and atchieved a perfect cure. The nobleman exulting in this miraculous operation, told it to his friends, and his friends told it to the prieſts, and the prieſts told it to the Archbiſhop of Moſcow, and the Archbiſhop of Moſcow put him under the ban of the church, from which he was driven forth for having this fragment of a beſtial body united with his, and baniſhed from the aſſemblies of the faithful all over the Ruſſian empire, ſo long as the ſaid piece of dog's ſcull remained united, and joined into the head of a Chriſtian man!

"But this nobleman, longing to be received again into the boſom of the church, and willing to endure any pain rather than not be honeſtly and truly cured, ſpoke to the ſurgeon, deſiring that he ſhould take away this piece of dog's ſcull; which being done, and his cure accompliſhed after another method, he was relieved from the ſentence of excommunication *."

Not the jealous and drunken prieſts of Ruſſia only, but the learned phyſicians of all countries, believed that a piece of dead bone might thus be united with the living ſcull, or rather with any other piece of bone which they knew not, nor even ſuſpected to be alive.

Every ſurgeon was in old times in the practice of requiring a piece of gold, which he hammered and beat out into a form and ſize ſuiting the openings made by fracture, or the hole made by his trepan:—how far this may have been deſigned to deceive the vulgar, or perſuade the friends; how ſoon this elymoſinary piece of gold was transferred to the pocket of the dextrous operator †, we need not ſeek to know,

* Tartarus quidam caput hujus graviter adeo enſe vulneraverat, ut, præter integumenta, cutem nempe piloſam, aliaque oſſis cranii etiam particula quædam ablata, adeo ut caput inſpicienti denudatum non ſolum, ſed et vulneratum, occurreret cranium. Chirurgus locum apertum quo repleret, occiſi canis ex cranio particulam deſumpſit, figura et magnitudine ei quæ enſe ex capite nobilis ablata reſpondentem, eamque loco læſo adaptavit; et hac methodo integre ſanitati redditus nobilis. Hic miraculoſe reſtitutus, rem geſtam, gaudio exultans, amicorum notorumve variis, enarravit, qui eandem theologis, et per hos metropolitano communicarunt, ſicque efficerunt, quod, excommunicatione inſtituta, ad loca ea quibus conveniebant Chriſtiani, per totam Ruſſiam, acceſſus nobili dicto denegatus fuerit, uſque dum oſſis capitis canini particula indicata unita maneret oſſibus capitis Chriſtiani hominis. Nobilis eccleſiæ membris annumerari mallens, quam, ad veram curationem, quævis non perferre, chirurgum oſſis canini fragmentum auferre juſſit, ſicque curatione alia adhibita, excommunicationis vim effugit.

† "There are ſurgeons, no doubt, (ſays Paræus), or rather pretenders to ſurgery, who in ſuch caſes receive a piece of money, (which of courſe muſt be gold, as it is to be within the body); and in the preſence of the pa-

ſince this is fairly implied, that among all ranks of men it was a received opinion, that a piece of bone, or a piece of gold, might be ingrafted upon the ſcull.

The moſt elaborate doctrines among the older writers concerning the office and uſes of the dura mater, do not bear the ſtamp of any more refined philoſophy; they did not know the bone to be alive, far leſs did they imagine that the dura mater was deſtined to nouriſh the ſcull; they even did not know that it was connected with its internal ſurface; they believed that there was naturally an interſtice betwixt the mediaſtinum and ſternum, and that a like interſtice was interpoſed betwixt the dura mater and ſcull: The dura mater, they imagined, belonged ſolely to the brain; they believed that the dura mater acted upon the brain like a glyſonian capſule; that the contraction of the dura mater promoted the circulation within the brain, as was manifeſted in the alternate riſing and falling of that membrane, when the brain was expoſed by wounds or trepan. They imagined this ſpace to be occupied by air only, and even made the bubbling out of that air through the chinks a proof of fracture: "For if the patient," ſays Fabricius, "cloſe firmly both noſe and mouth, and preſs the air upwards, he will diſcover the air to bubble out through the fiſſure, for the inflation of the dura mater forces out the air or humour, which is incloſed in the ſpace betwixt the ſcull and dura mater *."

Each of theſe pathologiſts believed moſt potently all the uſes that any other aſſigned for this cavity, and all the ſingularities which were deſcribed. Hildanus, on account of the free perſpiration through the ſutures, and other good conſequences of this open ſpace, approves entirely of what nature has done: "Spatium vero inter

tient beat it out to the form and ſize of the wound, and put it in there to defend the brain, and to be in place of bone, but they never fail next day to remove into their purſe." Vide Les Oeuvres de Parce, p. 241-2.—Though in thoſe times ſuch miſerable practices may have been reſorted to by theſe pretenders, to whom the cure of broken heads was uſually committed, yet I have no doubt that this inſertion of a plate of gold or ſilver was practiſed in good faith by men of ſkill; and though I have no conception of any kind of union betwixt ſuch a plate of metal and the ſubjacent parts, I have no doubt that the inciſion might heal over ſuch a foreign body, and the plate of ſilver lie harmleſsly betwixt the ſcull and the ſcalp, as a ball lodges for years among the muſcular parts, or is nitched into a bone, without producing caries, inflammation, or pain. In the Ephemerides German. anno 3. No. 278. is a caſe by Raygerius, of a ſoldier wounded in the head, who loſt a part of one parietal bone, as broad as the palm of the hand. This loſs was replaced with a thin and perforated plate of ſilver. The granulations ſhot through the holes in the ſilver plate, and encountering thoſe from the ſcalp united with them, incloſed the plate ſolidly in the cicatrix, ſo that, as Raygerius reports, it could be diſtinctly felt by preſſing it with the finger.

* Primum enim ſi æger clauſo ore et naribus ſpiritum omni conatu detineat, et ad ſuperiora impellat, ſi tunc per rimam exeat halitus, &c. Dura mater enim inflatur, ut aer ſeu humor qui eſt in ſpatio inter duram matrem et cranium per rimam extrudat.—*Fab. de Vulner.* cap. 7. p. 858.

ſuturas recte natura liberum reliquit,". &c. * Thus it happens that miſrepreſentation riſes on miſrepreſentation by natural degrees, till the abſurdity gets to a towering height; though Fabricius believed merely that the riſing of the dura mater drove the air naturally contained in this ſpace before it, Ruinhuiſen ſays a great deal more. He ſays, " We may conveniently enough diſcharge the matter from the dura mater, when the patient comes to cloſe his noſe and mouth, and ſo drives the included wind from the *breaſt to the head* †." " I do not well ſee (ſays Morgagni) how we can deny that the brain may ſometimes be more or leſs diſtant from the ſcull even in the living body." " That the brains of children lie very high, even at the full moon, was the decided opinion of Turner; wherefore he ſays, " the operation of trepan is to be in them performed with every precaution." All ancient authors aſcribe much influence to the moon in diſorders of the head, and Fallopius, in an eſpecial manner, believes that the brain is compreſſed: " That this ſpace is augmented betwixt the ſcull and the brain, when the moon ſhines throughout the whole night." Theſe neap-tides of the human intellect were carefully obſerved by all learned phyſicians; and ſurgeons were taught, according to the precept of Hudibras, how much ſafer and more officious it was to perform,

> " The free trepanning of the ſcull,
> As often as the moon's at full.

The influence of opinions, ſo remarkably ingenious and learned as theſe, is never ſlight; all the theories of injuries of the brain were more or leſs related to this ſuppoſed cavity: " It was by being depoſited in the empty ſpace that occurs betwixt the ſcull and dura mater, that extravaſated blood was ſuppoſed to inflame, corrupt, and be finally converted into pus ‡." It was not difficult to account for the generation of matter, when blood was firſt extravaſated, for the blood was corrupted by ſtagnation and heat, and by the new depoſition of unconcocted ſerum. " You will naturally inquire, (ſays Morgagni), why the blood, which was extravaſated within the ſcull, gave no immediate tokens of its effuſion, inſtead of beginning to do ſo many days after; without doubt, it is becauſe very ſmall drops, diſtilling very ſlowly from very ſmall veſſels, could not arrive till after ſome days to ſuch a quantity as to be injurious to the

* P. 18. † P. 148.

‡ In vacuo illo ſpatio quod inter cranium ac duram cerebri meningem intercedit, inflammatur aliquando ſanguis, ſuppuratuſque in abſceſſum convertitur. *Arnold.*

brain." Even the favourite doctrine of insensible perspiration suppressed by cold, was called in to account for the corruption of the dura mater. "This injury, by giving occasion, (from the constriction of the external vessels), for a greater quantity of blood being carried through the internal parts, and that in a less salubrious condition, by reason of the insensible perspiration being detained! corrupts the dura mater*." Such is the elaborate pathology of Morgagni.

It was still easier to account for the matter found under a fracture; they had this simple conception of such purulent effusion, viz. that it penetrated through the chinks of the fracture, and dropped inwards upon the brain†. When, upon perforating with the trepan, matter issued through the opening, they never doubted that it was the same which had dropped inwards through the fracture, and they estimated the danger according to the quantity of matter which might thus fell inwards upon the brain, or, in other words, according to the wideness of the fracture or fissure. "If only the outward table (says Musitani) be fractured, there is no manner of danger; but should both tables be fractured, there is the utmost danger, since the serum may there fall inwards upon the dura mater ‡." We cannot wonder, then, at the care with which they scraped every fissure, to see whether it penetrated, and trepanned every slight fracture, lest the sanies of the outward wound should fall upon the brain.

When there was no extravasated blood to corrupt, nor no open fracture to inundate the dura mater with matter, they bethought themselves, that all the body was transpirable, and why not the scull? "How to account (says Valleriola) for the sanies penetrating even into the brain, when there is neither fissure nor fracture of the scull, seems very hard; yet we shall cease to wonder how this happens, if we but reflect that the whole body is perspirable ‖." Sometimes "noxious matters were supposed to perspire from within through the cranial pores, to the infinite comfort of the cerebrum. §" The pus engendered within

* Morgagni, p. 89.

† Perforavi (says Verdue) atque evacuata materia quæ per rimam sub cranium paulatim descendit, symptomata cessarunt, &c. p. 212.

‡ "Si externa saltem lamina findatur rima, periculo vacat; periculosum vero est, ubi utraque lamina fissa est, cum sanies tum in duram matrem decidere possit." *Musitani*, p. 155.

‖ Natura aliquando pus noxiamque materiam sub cranio latitantem per iras inopinates extrudere consuevit. *Skenkius*.

§ "Sed quomodo ad meningas sanies usque penetraverit quum esset in osse fractura aut rima magis mirum videri potest. Sed tamen mirari desinemur, si intelleximus conspirabile esse universum corpus." *Valleriola*, p. 159. Folio.

the cranium, and which endangered the brain, was, in a particular manner, ſuppoſed to tranſpire through thoſe inviſible pores *; and ſuch was their perſuaſion of the importance of this tranſpiration of foul and fuliginous matters through the pores of the ſcalp, and the pores of the ſcull, that they believed a man could not a moment enjoy his intellect, nor live in health, without ſuch a diſcharge. "For all kinds of fumes aſcend by nature to the head, wherefore the head is porous, and thoſe vapours get vent, which, were they to be obſtructed, muſt injure the brain, and all the ſenſes therewith; it is by the open pores that the vapours eſcape †:" So ſays Vitalis de Furnes, the moſt learned of the eccleſiaſtics who have enriched our profeſſion with their theories. Nor did they diſdain every care of the external integuments of the head to keep the brain in good order, pure, and free from ſuch fuliginous vapours. "To preſerve a wholeſome ſtate of the body, (ſays Vitalis), a livelineſs of the ſenſes, and a vigorous condition of the brain, combing is of no ſlight importance, ſince, by combing the hair, the pores are opened, the noxious fumes exhaled, &c." quia pectinando pori aperiantur *. In modern times, this ſame pectinatio, this laudable attention to the exterior of the cranium, will perhaps be regarded not as a cauſe for this nimble and lively condition of the brain, but as an approved ſubſtitute. A blow upon the head, according to the apprehenſion of the older phyſiologiſts, neither killed the bone, nor injured the dura mater, but conſtipated the pores of the ſcull; "this is a full and perfect account of the whole affair, (ſays Magatus), both according to experience, and according to reaſon; according to reaſon, becauſe the bone being bruiſed, its pores are conſtricted, perſpiration ſuffocated, the natural heat extinguiſhed, and, of courſe, ill humours generated from ill-concocted matter, which, riſing in form of vapour, and, finding no exit, inflames and corrupts the contuſed bone, even from the contuſed ſurface down to the dura mater, which, being hetreunto connected by various ligaments, thoſe ligaments lead the corruption onwards from the bone to the dura mater, which is diſordered and inflamed by the foul mat-

* Accidit etiam quandoque in vulneribus capitis, quod ſanies non habeat liberum exitum a vulnere, ſicque perporoſitates oſſis reſudet ab intra cranium.

† Et quoniam omnes fumoſitates ad caput aſcendunt, ideo caput eſt poroſum ut vapores exeant, qui, ſi manerent, cerebrum læderent, et, per conſequens, omnes ſenſus; cælerum apertis poris illæ fumoſitates exeunt. Dom. de Vitalis de Furnes.

† Ideo ad corporis ſanitatem, bonumque ſtatum cerebri, et vivacitatem ſenſuum, valet pectinatio, quia pectinando pori aperiantur, fumi exhalantur. De Vitalis de Furnes, p. 72.

ter collected upon it, offenſive both from its natural qualities, and the peſtilent exhalations *."

What, then, is the ſum of this philoſophy, which has occupied the minds of men celebrated in paſt ages for talents and knowledge, and regulated their practice? What will learning do for us in this department of ſurgery? It will teach us, that the ſcull is a mere bone, ſuch as we ſee it on the ſtudent's table, compoſed of diſtinct pieces joined by ſutures, having cancelli filled with fat, to prevent its brittleneſs, and perforated on both its tables with pores, calculated to allow of every needful tranſudation; that dead bone may be united with the ſcull, or its injuries and loſs of ſubſtance replaced by other foreign matter; that there is betwixt the ſcull and dura mater a ſpace full of air, ſeparating the inner ſurface of the ſcull from the membrane which immediately covers the brain; that the cranium has a free perſpiration through its ſutures, and through every pore; that the ſerum or purulence which injures the brain is either generated from extravaſated blood, or diſtils through the ſutures, or tranſudes through the pores of the ſcull, or is a fermentation of ill-concocted matter, proceeding from the natural tranſpiration being repreſſed! This is all: unleſs I am to add, that it would teach us the practical leſſons of digeſting, exfoliating, mundifying, incarning, and cicatriſing wounds of the ſcull.

I am not aſhamed to have detained you with a preliminary ſketch, which will enlarge your conceptions, and extend your views, and make you leſs unwilling to part with the prejudices eſtabliſhed by time and preſcription, conſecrated by high authorities, and intermixed † with every part of learning. It may ſeem ſuperfluous to remind even a tyro, that bone lives, grows, and is nouriſhed; it may ſeem wic-

* "Rem autem ſecus ſe habere, et ratio et experientia demonſtrant; ratio, quidem, quoniam oſſe contuſo CONSTIPANTUR ejus *pori prohibeturque eventatio et labefactatus natibus, calor ut neceſſarium* ſit ex incocto alimento ichores pravos ſuboriri, *et elevari halitus, qui, cum eis non pateat exitus*, primus os contuſum inficiunt, inflammant, atque corrumpunt, deinde quod ſanum erat uſque ad membranam. Hæc autem, cum pluribus ligamentis connectuntur cum cranio, fieri non poteſt, quia ligamenta, quæ cum emortuo oſſe copulantur, putreſcant, atque ſupra membranam ipſam colligantur ichores pravi, qui et propria qualitate, et halitibus quos emittunt ipſam meningem male afficiunt, ac inflammant." *Magatus*, p. 188.

† My reader would ſurely be amuſed with the conceited and pragmatical manner in which the old ſurgeons deſcribed theſe important proceſſes. In a caſe where, upon opening in a boy a large tumor on the ſcalp, the ſurgeon found the ſcull black and carious, he deſcribes the caſe in theſe words: "Vulnus autem tractavi primo digerentibus, ſecundo mundificantibus, tertio incarnantibus, et denique quarto cicatizantribus." Sculteti, Appendix, Caſe xvi.—One may eaſily imagine, that they would act, with much deliberation and dignity, the ſcene they ſo formally deſcribe.

ked and malicious to revive the memory of obſolete follies, only to make them the ſubject of wanton ridicule, while our own beſt knowledge is yet far below the level of truth, and is probably deſtined to become the ſport of future theoriſts. But there are ſome follies which it is uſeful to know, and I am perſuaded that this rude fore-ground which I have preſented of rubbiſh and ruins, while it enriches the general ſketch, will ſerve to make the diſtance clear and intereſting.

To this kind of philoſophy every fact is adverſe; and it muſt be a matter of wonder, that men could practiſe our profeſſion, and ſee bone occaſionally ſubject to all the diſeaſes of the ſoft parts, without being conſcious of its life and circulation. The ſkull is a part of the living ſyſtem, not leſs dependent on the general circulation, not leſs intimately connected with the ſurrounding parts, not leſs ſubject to diſeaſe and death, than the moſt delicate and vaſcular membranes of the body; and its ſlighteſt injuries draw after them the moſt diſmal conſequences, for it defends the moſt important organ of the body. But, before we enter on the pathology of the ſkull, it cannot be ſuperfluous to reflect for a moment on thoſe conceptions of the ſtructure of bone in general, which the inquiries of modern pathologiſts naturally ſuggeſt.

The form and ſtructure of every bone is determined in the arrangement of its arteries, long before the bony-ſecretion begins; and, in the courſe of years, the ſize and ſhape of the bone are accompliſhed by the gradual ſecretion of that animal earth which gives it ſtrength and firmneſs. When we inject the bones of an infant, we perceive, by our ſenſes, that they are vaſcular in a high degree, proportioned to that profuſe and continual ſecretion for which this vaſcularity is deſtined. When we give madder along with its food to an adult animal, we find, from the manner in which all its bones are tinged, that this ſecretion is perpetual and inceſſant; that the health of the bony ſyſtem conſiſts in the ſound action of its veſſels, and that the firm or earthy parts of the bones is continually ſecreted and abſorbed. When, having injected an adult bone, we diſſolve its earthy parts in nitric acid, and waſh them away, we find that it has loſt nothing of its vaſcularity, which ſeems, on the contrary, to have increaſed with its growth; and, when a bone is fractured, we find that this vigorous ſecretion is ready to replace the loſt, or to re-unite the broken parts of the bone with callus, which callus is, from its recent ſecretion, more vaſcular than bone. Every diſeaſe, every operation, every diſſection, proves to us, that this active circulation in the veſſels of a bone is unceaſing. In amputation, the ſurgeon ſees the bone, eſpecially its cancelli, ſtreaming with blood. In trepanning the ſcull, blood bubbles up through the hole, long be-

fore he has reached the dura mater; and, when his ſaw tears up duſt only, and that dry and bloodleſs, he is conſcious that the bone is dead. A bone bruiſed is ſo far ſuſceptible of ecchymoſis, that extravaſations of blood may be ſeen amongſt its lamellæ. A bone cut up by the wound of a ſabre may be re-united like any ſoft part. A bone laid naked, if it do not die, granulates, and adheres with the other parts. A bone, when ſo injured by blows, by fire, by cauſtics, by venereal, or other diſeaſes, that it muſt die, grows black, juſt as the ſoft parts blacken by ſphacelus, and ſeparates with granulations ſprouting from the neighbouring bone, as ſphacelated parts ſeparate from thoſe which are ſtill alive. The entire ſhaft of a bone, when thus diſeaſed, and rejected as dead, is diſcharged ſlowly, and often in fragments, through the ulcers, while the ſurrounding membranes, and the ſtill healthy heads of the bone, are producing a new ſhaft ready to ſupply the loſs. Often from the ſurface of diſeaſed ulcerating bones ſpring up ſoft fungi of very rapid growth; and, when a fracture is tormented with perpetual motion, or from impatience, ill health, or want of care, the parts are prevented from re-uniting; or when, from a blow or bruiſe, a bone is thrown into diſeaſed action, and its veſſels kept in a ſtate of continued excitement;—the bony ſecretion, having no limits, forms a tumor, ſolid as the bone from which it ſprings, uſually cancellated, often having in it cavities filled with pus, and conſiſting of a ſecretion, partly cartilaginous, partly bony, and ſo maſſive, as to load the part with its bulk, or not unfrequently to deſtroy it by its preſſure.

The ſcull is highly vaſcular, has various ſources of circulation and nouriſhment, and is peculiarly tenacious of life; but all the phænomena connected with complicated ſtructure, are, by the uſual methods of teaching anatomy, induſtriouſly removed from obſervation. The ſcalp is claſſed along with the common integuments, diſtinguiſhed only as being peculiarly vaſcular. The ſcull is deſcribed along with the bones, each bone is ſeparately deſcribed, and the forms, and proceſſes, and holes of theſe bones, occupy ſo entirely our hours of ſtudy, that we form no conception of any thing but thoſe forms: The dura mater, again, is deſcribed along with the brain, as its peculiar covering, and nothing obſerved but its connections, and eſpecially thoſe proceſſes by which it protects the cerebellum, or divides the hemiſpheres of the brain. It is by this anatomical method that every thing truly intereſting is removed from our notice; and the imagination or reaſon being allowed no ſhare, we are taught to ſtudy anatomy as a taſk of the memory only, without one laudable or uſeful purpoſe.

The integuments or ſcalp, *i. e.* the ſucceſſive layers of the ſkin, occipito-frontalis muſcle,

cellular ſubſtance, and pericranium, are cloſely connected with each other, and with the ſcull, by one continued tiſſue of veſſels. When theſe integuments are ſeparated from the ſcull, even in the diſſection of the dead body, the ſcull ſweats out drops of blood from every point of its ſurface. The outer table of the ſcull is ſo plainly alive, that the ſurgeon can perfectly judge of its death: when alive, it is moiſt, clear, and bleeds upon being perforated; it is by its dryneſs and faded colour, and its bloodleſs appearance, (and when trepanned), by the dryneſs of the duſt turned out in ſawing, that the ſurgeon is able to pronounce it carious and dead. The ſcull is nouriſhed, yet not altogether dependent for its circulation on its perioſteum and ſcalp: a piece of ſcalp may not only be raiſed by a clean cut of the ſabre, and laid down again ſo as to adhere to the bone, as to any ſoft part, but being cut off, it is replaced, in part at leaſt, by granulations from the ſcull. The integuments not cut, but lacerated, whirled off from the ſcull, flapped down over the face and ears, ſoiled with earth and mud, will, upon being cleaned, and laid in their place, adhere to the ſcull.

The ſcull re-unites thus eaſily with the integuments, from having every eſſential proviſion for life and circulation within itſelf. Anatomiſts ſtudying merely the anatomy, have deſcribed the ſcull as compoſed of two tables, with intermediate cancelli, or net-work of bony fibres; theſe cancelli are deſcribed as uſeful in the cylindric bones for enlarging their bulk, without augmenting their weight, or as cells fitted to contain the marrow which is to lubricate the bone; and if ever theſe cells have been regarded as vaſcular, it is as having a vaſcularity appropriated to the ſecretion of marrow. The theoriſt, thus occupied in deſcribing a bone, is reminded of nothing but its fragility, and the danger of its wanting oil. The practical ſurgeon, on the contrary, when he ſees the cancelli in amputations red as fleſh, and ſtreaming with blood, or when, in trepanning, he ſees blood guſhing up through the trepan-hole, is conſcious that this interpoſed cancellated ſtructure is the centre of circulation and nouriſhment to the bone, and that the cellular ſubſtance which ſurrounds the ſoft parts to nouriſh them, muſt, in bone, be thus depoſited in the centre, that it may be maintained in its form, and make a part of the common ſtructure of the bone. It is from this arrangement, and from the perfect protection of its cellular ſubſtance, and circulating ſyſtem of veſſels, that bone is peculiarly tenacious of life. The thigh-bone may be broken into fragments; many of theſe may be ſo diſplaced, as to ſeem ſeparated from all natural connection with the bone; yet the circulation of each piece ſurvives; and, though the detached fragments are ſmall, the bone ſhortened, and twiſted in-

to the moſt uncouth forms, each part lives, and is aſſimilated into the general maſs of vaſcularity, by which the particular pieces are made to adhere, and callus is in the end ſecreted, ſo as to re-unite them firmly. So is it with the ſcull, of which large and broad pieces are often apparently inſulated by fractures, ſurrounding the piece of bone on all ſides; and the ſurgeon, having performed the operation of trepan, paſſes his probe or finger into the hole, and is conſcious that the dura mater is as completely detached from the internal, as the pericranium is, by laceration, or by ſcraping, from the external ſurface of the ſcull; and yet ſuch inſulated pieces circumſcribed by lines of fracture, after being depreſſed by violence, are as violently raiſed by working with the levator; the ſurgeon believes that he ſhould in duty pull them away, and yet is fearful of doing harm; they are left ſlightly connected with the ſcull, and very ſlight, if at all with their own nutritious membranes, and yet they live, and are re-united, and granulate, and heal. Bone is univerſally, from the firmneſs of its ſtructure, tenacious of life; and the almoſt detached portions of a fractured tibia, and the rudely-elevated fragments of a fractured ſcull, thus preſerving their circulation, would almoſt perſuade us, that a piece of bone, like a tooth deſtined for tranſplantation, might altogether be detached, waſhed in water, and re-committed to its place, ſo as to adhere.

The circulation thus maintained by the pericranium from without, and maintained ſo vigorous in the ſtructure of the bone itſelf, is well ſupported from within; for, indeed, if we were to aſſign the nouriſhment of the ſcull to any one ſource, it would be to the dura mater, which is more properly the internal perioſteum of the ſcull, than a membrane belonging to the brain; with the brain it has no vaſcular connection, but is ſeparated by a halitus or ſecretion, ſimilar to that of other cavities, as thoſe of the pericardium or peritoneum; with the ſcull it is ſo connected, that the ſcull-cap is in diſſection torn up with the greateſt force, and every point is covered with the ruptured mouths of delicate and bleeding veſſels.

The dura mater is very firmly attached to the whole internal ſurface of the ſcull; it is hard, firm, grates like a cartilage when cut with ſciſſars, and has a gliſtening ſurface, like the capſule of a joint: it has no appearance of delicacy or ſenſibility, for indeed it has none, ſince acids, cauſtics, and even the actual cautery, have been applied to it, and it has been cut and torn in experiments on living animals, without exciting pain. It enters very ſlowly into diſeaſed action, and has as little appearance of vaſcularity as of ſenſibility; often it is inflamed, and even ſuppurated, without changing colour, and is little affected by our moſt ſubtile injections. But the

injection, which does not change the colour of the dura mater, colours the bone, paſſes through its veſſels, and runs out from innumerable minute oriſices, when the dura mater is torn away: It appears from every circumſtance, that the vaſcularity of the dura mater is deſtined for the nouriſhment of the ſcull, and may be truly named its Internal Perioſteum; and the great arteries and veins (as they are called) of the dura mater might be more juſtly deſcribed as the Nutritious Veſſels of the ſcull. Were we firſt to obſerve this vaſcular connection, and then glance our eye haſtily over the facts relating to it, we ſhould be apt to pronounce the ſcull entirely dependent for its nouriſhment on the dura mater; and that its connection cannot be diſſolved by diſeaſe, without corruption of the bone, and ſuppuration of the brain, nor detached by violence, without effuſion of blood. Yet this important ſource of nouriſhment the ſcull may alſo diſpenſe with, and live; for, in caſes of the moſt extenſive effuſions of blood under the ſcull, and where this membrane is divided from it by a thick and ſolid cake of coagulated blood, we find, that the ſcull bleeds in trepanning, and granulates during the cure; and although it may ſeem a fact difficult to aſcertain, I ſhall prove to your conviction, that the dura mater may by a ſhock be detached from the ſcull, and adhere again to it without harm, leaving unequivocal marks by which in diſſection it can be known that it had been ſeparated and reunited.

I take a pleaſure in ſubmitting to your review theſe facts, ſo oppoſite to the doctrines, and ſo inimical to the practice of the older ſurgeons; for they will teach you, if you dwell upon them, to have a perfect confidence in the powers of nature. With ſo many ſources of circulation, the life of the ſcull is very ſecure: The ſcalp, the ſcull, and the dura mater, are the ſucceſſive integuments of the brain, they mutually ſupport each other, ſo that they cannot be individually injured; and we have reaſon to believe, that when the dura mater ſuppurates, and the brain is endangered, the whole ſyſtem of this vaſcular connection has ſuffered a fatal ſhock, or the bone, the centre of that circulation, has been deadened by the blow. I fear that thoſe general concluſions, which by a ſort of anticipation I have laid before you, may ſeem more allied with ſpeculation than practice, yet are they the true and genuine ſource of your prognoſtics. The eſtabliſhing more authentically the concluſions which I have mentioned in a general way, will convey the moſt uſeful leſſons in ſurgery, and in medicine too; and I now willingly forſake theſe ſuch general arrangements, to examine the ſpecial facts by which they are to be proved.

The ſeveral integuments of the brain, the ſcalp, the ſcull, and the dura mater, are not merely contiguous; they are not merely layers of integuments of various ſolidity,

which may be diſſected and deſcribed under various denominations of parts; they are eſſentially connected as a whole, having one continuous circulation, and having their diſeaſe in common; and as the teſticle, vaginal coat, and ſcrotum, are uſually involved in the ſame common diſeaſe, and when enlarged form one general tumor; ſo the ſcalp, ſcull, and dura mater, are at times enlarged by one common exciting cauſe. We have daily examples of a limb being deformed, and degenerating into a ponderous and ſolid tumor, in conſequence of a general injury extending to the bone, and exciting the bone, in common with the ſoft parts, to a high ſtate of ſecretion. When, for example, the ſhoulder-bone is hurt by a blow, or the thigh-bone bruiſed or cruſhed by a carriage-wheel, ſo as to have the general action of the veſſels excited, without the ſtructure of the parts being deſtroyed, there enſues a general tumor of the ſhoulder, or thigh, firm, hard, and bony, which is found upon diſſection to be ſometimes a cancellated, ſometimes a ſolid tumor of the bone. In like manner, the head being injured by a blow, degenerates into a tumor, in which the brain and the ſcull are equally enlarged.

There is perhaps no miſtake more natural or frequent than this, that in caſes of hydrocephalus, the ſcull is merely diſtended by the increaſe of the brain, and becomes thinner as it diſtends; I ſhall prove to you, that the ſcull grows and forms an active part of the tumor, (a fact which is not eaſily aſcertained, ſince ſuch general injuries are uſually fatal at a very early period), and that in all caſes of hydrocephalus, while the ſubſtance of the brain is waſted, the cranium is in every ſenſe, and in all its proportions, enlarged in bulk and in ſubſtance, as well as in extent; that it even acquires in a child a ſolidity and thickneſs far exceeding thoſe of the adult.

"I was invited (ſays Trioen) by Petrus Sandra, when, in our city of Leyden, the burying-place of a certain family was to be opened. Many relations of the houſe were there to ſee the remains of their ſeveral friends dug up, and to have them replaced in new graves. Sandra, who had required my company along with him, deſired that the grave of his ſiſter ſhould be opened. "Theſe are the remains (ſays he) of a beloved ſiſter, whoſe ſcull is not yet conſumed by time, I wiſhed you ſhould ſee."

"The ſcull being diſinterred, I found it larger than was natural for one of her age. The coronal and ſagittal ſutures quite obliterated; in the bregma were two oſſa Wormiana, and two ſimilar ones in the point of the lamboid ſuture, while there was in the left and upper part of the occiput a perforation of both tables. The cauſe of theſe phænomena was related to me thus:

"While a child of no more than eight months old, a thoughtleſs ſervant-girl taking

her by both arms, toſſed her in ſport up in the air, and down again alternately, till at laſt the child's head ſtruck the frieze of the door-piece. Her cries being appeaſed, her parents willingly believed that ſhe had ſuffered no eſſential harm; but in leſs than a month they obſerved a ſillineſs and ſleepineſs in the child, the faculties manifeſtly injured, the head ſlowly enlarging, till at laſt the whole nouriſhment of the body apparently being drawn towards the head, it attained the unnatural ſize repreſented in the drawing, exceeding greatly that of an adult ſcull, while the reſt of the body ſeemed deprived of nouriſhment. Many phyſicians were conſulted, but in vain. She lived to the 14th year of her age, without growing a finger's breadth during the whole period; and this ſlight hiſtory of her condition, and the cauſe of this diſorder, alone remains *."

In all the hydrocephalic children I have ſeen grown up to years, the ſize and thickneſs of the ſcull, the ſolidity of its bones, and ſometimes the firmneſs of the ſutures, have kept an equal pace with the enlargement of the brain. The oſſific proceſs has been, as in this caſe, peculiarly vigorous; for in this young lady it is worthy of notice, that the indentations of the ſutures were obliterated, and the bones conſolidated. Indeed, it is my perſuaſion, that every part of the body, when its veſſels are diſtended, or otherwiſe excited to increaſed action, muſt grow: Sometimes preſſure, ſometimes a blow, ſometimes diſeaſed action, (as ſyphilitic), ſometimes an increaſe of weight, as in diſeaſes of the breaſts or teſticles, ſometimes the irritation of a foreign body, as a piece of ſtick thruſt through the ear

* "Fæcundiſſimi ac doctiſſimi viri, Alberti Alberthomæ, ſacrorum myſtæ fæcundiſſimi Lugdini Batavorum Funeralia celebrandi cauſa, tumulus familiæ loculis quondam repoſitis erat evacuandus; qua occaſione conſanguinii, ut plurimum, ſeſe ſiſtunt, ut videant, quorum cineres ſuperſint, ac novis indigeant repoſitoriis: huic actui intereſſe, unus illorum Petrus Sandra Medicinæ Doctor rogavit, atque defuncte ſuæ ſororis urnas effodere juſſit: HÆC CONTINENT (inquit) AMATÆ SONORIS CINERES, CUJUS CRANIUM, SI NONDUM TEMPORE ABSUMPTE, MONSTRARE TIBI ES ANIMUS; hinc aperto conditorio ſequentia in eo notandi mihi præbuit facultatem. Molem ratione ætatis ſolito majorem, oſſium bregmatum frontiſque obliteratas ſuturas, circa fonticulum duo oſſa wormiani, ut plurimum in Lambdoidaea ſincipitis cum occipitis oſſa conjungente reperiunda ſimillima, in parte occipiti ſiniſtri ſuperiore foramen in meninges perium, animadverti; quorum phænomenum cauſam ſequens narrabit hiſtoria.

"Ambabus ulnis dum infantem, hoc tempore octimeſtrem, jocandi cauſa in altum tollit, ac reciproce demittit ancilla, tandem illius occiput in epiſtylium laquearis porticulæ ingreſſum ornantis incutit. Compoſitis vociferationibus, contuſionem nullius momenti habuere parentes; altero vero menſe vix elapſo, filiolæ inſipientiam, eam ingenii facultatibus orbam, ac inertem obſervaverunt, pedetentim augeri cranium, ſenſimque in hanc, quam exhibet archetypum, evaſiſſe molem, adeo ut ſuccus nutritius cæteris corporis partibus negatus, ſoli capiti proſpicere ſtuduerit; interim nulla non in auxilium vocata, abſque frugæ tamen: vixit in annum nativitatis ſuæ decimum quartum, quo temporis intervallo ne latum ad creverat unguem, ac poſte fata hanc nobis reliquerit hiſtoriam."—*Trioen Obſervat. Med. Chirurg.* p. 23.

or lip of a ſavage, or a ſkewer ſtruck into the liver of a fowl, is the exciting cauſe. Vaſcular action will increaſe the natural ſecretion; and a tumor thus produced and continued will have no limits to its growth, but muſt increaſe while the blood circulates, and its own ſtructure remains entire.

Caſe, by Aurivellius, of a woman born of healthy parents, (her father a ſoldier, her mother a hale and ſtout country-woman, herſelf one of four healthy and thriving children, born by her mother to the ſame huſband), who died of hydrocephalus, aged 45.

"This woman was born ſound and healthy, without viſible ſpot or blemiſh, but ſoon after birth was attacked, as the children of the lower people often are, with ſcald head, which was cured by being powdered with the duſt of worm-eaten wood. When the child was about ſix months old, the head began ſenſibly to increaſe in ſize, and extended continually; the face and body meanwhile growing very ſlowly, inſomuch that, at adult years, while the head was of gigantic ſize, ſhe had the ſlender body of a child ſix years old. Such was the weight of the head, that ſhe never could raiſe it; nor had ſhe ever been able to ſtand, but lay always in bed, unable to turn, or even to convey food to the mouth, the right hand being paralytic; yet in this condition ſhe enjoyed ſuch health as to ſurvive the infantile diſeaſes. She ſuffered the meaſles, the ſmall-pox, and a ſort of intermittent fever; ſhe continued during childhood to have frequently bowel-complaints from worms, and was often tortured with toothachs, from corrupted teeth. She ate heartily, and was fond of aſtringent wines. But always when raiſed up in bed, ſhe was ſeized with eructations, and inclination to puke. All the excretions were regular, and from the age of puberty, the menſes, though ſparing, and ſomewhat pale, flowed with great regularity.

Thus ſhe continued to live, and not only attained to puberty, but ſurvived to the fortieth year with very perfect ſenſes, and a degree of reaſon. Her face was ſilly like that of an idiot, continually inclined to laugh, the mouth gaping, the ſaliva flowing over the lips, and the ſpeech very indiſtinct; yet ſhe diſputed violently with thoſe who ſaid ſhe was an idiot. Her mother bewailed her fate with ſobs and tears, but was conſoled by the contented ſtate of her child, who aſked her why ſhe cried?—that ſhe had no reaſon to cry. She uſed to command, and to be eaſily offended. She knew thoſe whom ſhe had once ſeen, and was able to diſtinguiſh the rank and circumſtances of thoſe who viſited her. When, the year preceding her

death, her picture was drawn, ſhe wondered, and inquired very anxiouſly the reaſon of what was doing. She was anxious to cover herſelf decently, and ſpoke to her mother about receiving any new viſitors with reſpect. She had learnt from the clergyman ſome ſhort prayers: in ſpite of all the pains he beſtowed on her, ſhe never could be taught to read, but acknowledged God in Chriſt, in whoſe name ſhe was baptized. She died ſuddenly in the forty-fifth year of her age.

"The body being given for diſſection, the head was found of an enormous bulk; the abdomen was alſo full in proportion to the reſt of the body, but the breaſt, neck, and limbs, were thoſe of a child. The forehead was broader than the occiput, and meaſured three-fourths of a Swediſh foot. The back acroſs the ſhoulders meaſured exactly the ſame.

"There was in the ſpine a double lateral curvature, and the thorax followed this curvature, ſo that on the bulging ſide the ribs were far diſtant, but on the other ſide twiſted and plaited over one another. The one haunch was in like manner higher than the other, while the legs were ſo ſtrangely diſtorted one way, that the one leg was turned towards the inſide of the thigh, the other towards the outſide of the correſponding thigh. In the thorax and abdomen there was nothing irregular, except the diſtorted poſture of the viſcera, and their ſmallneſs, proceeding from the diſtortion and littleneſs of the body, and the peculiar ſize of the veſſels going towards the head, which were much larger, in proportion, than thoſe going to the lower part of the body. In the integuments of the head, nothing particular was obſerved, nor was there the ſmalleſt appearance of effuſed ſerum. But the cranium adhered ſo firmly to the dura mater, that it could not be torn off without violence, when a profuſion of limpid water ruſhed out.

"The ſcull-cap being torn up, and along with it the adhering part of the dura mater, the brain itſelf appeared. And as the head (laid out for diſſection) hung backwards, the brain ſeemed like a bladder, pendulous, and partly full of water. On its ſurface appeared no veſtige of convolutions; it was like a plain and extended membrane: being more freely opened, water flowed out, and the ſubſtance of the cerebrum was found not to exceed a twelfth of an inch in thickneſs, while yet the diſtinction betwixt the internal white and medullary, and the external cineritious or cortical ſubſtance, was perfect. It would appear that the water had been collected in the proper ventricles of the brain, but the bottom of theſe cavities had loſt their natural forms, the eminences were flattened, and the thalami nervorum opticorum ſo ſeparated from each other, that the anterior commiſſure of the brain was diſtinctly ſeen. But, on the baſis of the brain, in the cerebellum, in the crura

cerebri, or medulla oblongata, or the exit of the nerves, nothing unuſual was obſerved.

"Such was the enormous ſize of the ſcull-cap, cut off in the uſual manner above the orbitary hole, by the margin of the ſquamous ſuture, that it held nine pounds of water; and ſo remarkably was it changed in form, that you would have miſtaken the fore for the back part of the ſcull, for it was in all dimenſions ſo much larger towards the forehead and ſinciput, than towards the occiput, that to an unſkilful perſon, or upon a flight glance, the fore-part would have ſeemed to have been turned backwards: The ſcull was broadeſt at the wings of the ſphenoid bone; thence it gradually contracted towards the occiput, where it was extremely narrow. The forehead projected remarkably over the ſockets of the eyes and the root of the noſe, not with that gradual ſlope which is natural to the forehead, but riſing ſuddenly and perpendicularly towards the vertex. Nor were the ſides or temples of their natural flatneſs, but round and bulging; the meeting of the parietal bones in the ſagittal ſuture was raiſed, not in one point only, but in all its length, like the ridge of a penthouſe; but all the reſt of the head was ſo globular, that the uſual prominences in the centres of the bones were not perceived.

"To convey a ſtill more correct idea of this deformity, here follows a table of the dimenſions, compared with the dimenſions of two natural ſculls.

TABLE.

	In calvar. morboſ.	In calvar. perfect.
Convexitas, a glabella per verticem ad locum oppoſitum occipitis,	147	96
Convexitas lateralis ſuturæ coronalis,	132	70
Convexitas ſuper gibboſitates oſſ. vertic.	136	89
Circumferentia,	220	180
Alitudo maxima,	50	25
Axis ſectionis major,	70	65
Axis calvariæ maxima intermedium frontem et occiput præcidenti altior,	76	65
Axis ſectionis minor,	53	48

"In reſpect of thickneſs, it differed very little from that of the natural ſcull of a woman; it was thickeſt in thoſe parts where ſtrength is required; all the ſutures were

close, and in many places the bones inseparably joined. The coronal suture is perfect in all its semicircle; there are many ossa triquetra, small at the sides, hardly distinguishable, but larger towards the vertex, and surrounded by sutures, so as to preserve to them the form of distinct bones. The parietal bones are at the fore-part entirely united, so that on the external, as well as on the internal surface, there is no mark of the sagittal suture; but, towards the back-part, they are separated by a complete and open suture, formed with small indentations, from the upper extremity of which goes off a similar suture, terminating in firm bone. The whole of the lambdoid suture is also visible, and is interrupted, like the coronal, with many small bones, and from the lower part of this lambdoid suture, two other sutures run upwards into the parietal bones, that of the right-side joining with the fore-mentioned irregular and retrograde branch of the sagittal suture, so as to comprehend within the lines of those three sutures, an os triquetrum, an irregular bone of no less than four inches in length, united in a small part of its circle with the right parietal bone. Innumerable small bones formed the two squamous sutures, which, being separated on one side of the head by the maceration, left large openings.

"The skeleton, in general, was that of a grown woman, without the slightest mark of the place of the epiphysis *."

* Dicta muliercula, Catharine Olair Filia, patre orta erat robusto, gregario militi; et matre pariter vegeta, ad hunc usque diem superstite, quæ tres alios liberos ex eodem patre pepererat, sanos eosdem vegetosque. Nullum dicebatur ex materno utero cum vitæ usura tulisse vitium, aut nævum ullum. Non diu vero post nativitatem, caput faciemque mala scabies occupaverat, quam ut depelleret mater, farinam adsperserat ligni putridi, a vermibus erosi. Circa sextum postea ætatis mensem ineuntem, caput manifeste cœperat tumere, et continue dein magis magisque intumuerat, facie interea ac reliquo corpore exigua admodum incrementa capiente; usque eo, ut in adulta etiam ætate, illi gigantia magnitudo, huic puellæ sex, vel septennis tenera statura fuerit. Inde caput ipsa nunquam potuerat erigeri; nec pedibus insistendi periculum unquam fecerat, lecto per continuos annos adfixa, in qua nec vertere se ipsa valuerat, nec cibum unquam ad os adferre, dextra manet semper impotens. Nihilo tamen minus suis in cunis, præter spem et vota, vitam ita traxerat, ut feliciter et morbillis defuncta esset, et variolis, et febre quadam intermittente; ac præterea constanti ejus morbo non se adjunxissent, nisi infantilibus annis tormina a vermibus, posteaque frequentiores dentium dolores, unde plurimam hi partem exisi fuerunt. Cibos fere semper bene appetierat, maxime quæ gustum delectarent, ut lactucinia; quin etiam placuerat vinum adustum. Sed tamen erecta quoties teneretur, ructibus et sensu instantis vomitus vexata fuerat. Excretiones communes plerumque rite processerant, et sexui proprias a pubera ætate regulariter habuerat, sed parciores tamen quam esse soleant, pallidioresque.

Sic non adultam modo, sed quadraginta annorum ætatem assecuta, sensibus externis semper valuerat, et rationis usu, non multo quidem, aliquo tamen erat gavisa. Vultu ad risum composito, hiante ore, et defluenta saliva, loquela item indistincta, fatuæ speciem perpetuo exhibuerat; sed fatuam tamen, ut putarent alii, se non esse acri-

Thus do we remark the whole head growing, and the ſcull increaſing, at once in extent and thickneſs, when excited by a blow. We are conſcious, that diſten-

ter contenderat. Matrem filiæ ſortem cum gemitu et lacrimis conqueſtam, ſolita erat conſolari, ipſam ſe contentam profeſſa, nec eſſe poſtulans, cur funderet illa lacrimas? Imperitaverat aliis, et offenſa iras conceperat. Quos ſemel viderat, agnoverat redeuntes, et a domino diſtinxerat famulum. Altero ante mortem anno, quum advenniſſent, qui faciem et corporis habitum pictura effingerent, ejuſmodi rei curioſe quæſitaverat cauſam; de corpore tegendo ſolicita fuerat; ac ſimul de novis hoſpitibus bene recipiendis matrem rogitaverat. Precum unam alteramve formulam breviorem addidicerat, ſed quacunque ab eccleſiæ miniſtris adhibita opera, literarum characteres, quantum ad libros legendos ſufficerat, non didicerat dignoſcere. Deum ſi habere profeſſa erat, quem Chriſtum nominaverat, a quo eſſet baptizata. Miſeram vero vitam, quum quadraginta quinque annos duraverat, tandem ſubita mors abrupit, anni M,DCC,LXI. menſi Maio, ad finem vergente.

Contemplationi anatomicæ traditum cadaver mox capitis enorme exhibuit volumen; abdomen itidem, pro reliquo corpore, magnum; faciem vero fronti ſubjectam, collum, thoracem, artuſque omnes ejus magnitudinis, quæ puerili ætati conveniat. Frons occipiti latior, pedis ſuecici tres æquabat partes quartas, quæ fere menſura ſummum etiam dorſum ab uno humero ad alterum emetiebatur. In latera duplici flexu curvata dorſi ſpina thoracis latera, ſuperioris flexus modum ſequi ſic coegerat, ut ab uno latere, quod magis exſtabat, magis inter ſe diſtarent, coſtæ, ab altero, quod compreſſum, propinque et imbricatim fere adjaceret una alteri. Sic et coxa una altera altior. Artus autem inferiores mire contorti; ita ut cruris prior pars femoris parti, in uno, interiori, in altero, exteriori, reſponderet; cruro vero poſitum pedes ſequebantur.

In abdomine et ſubjecta pelvi, pariter atque in thorace et collo, præter id, quod flexa ſpina, et coxarum diſpar altitudo, in partium ſitu mutaverant, præterque dictam ſupra partium exiguam molem; ſola mereri attentionem videbatur morboſa vaſorum ſanguiferorum proportio, quæ partium magnitudini diverſæ ita reſpondebat, ut, quæ ad caput aſcenderent, arteriæ ampliores multo illis eſſent, quæ ad inferiora artuſque digrederentur. Tanto autem magis a ſani corporis modo deflexerat tunc cerebrum, tunc ejus oſſia camera, quæ, ad viſcus tam nobilem defendendum facta, ad hujus ſe format figuram. In externis ejus integumentis, præter diſtentionem nihil obſervatum eſt inſoliti, neque inter ea ſtagnantis aquæ repertum vel minimum. Calvariæ autem quum arctiſſimi craſſior cerebri membrana adhærerit, removeri iſtius fornicata portio ſine violentia non petuit; ex quo accidit, ut mox ſub hac opera limpidæ aquæ magna copia erumperet. Detractis ſic et calvaria, et quæ huic adfixa manebat craſſior membrana, cerebrum comparebat flaccidum, in eo, quo tenebatur examinandum caput, ſitu, poſteriora verſus dependens, veſicæ inſtar, quæ aliquo intus contento humore partim concidit, partim pindula eſt. Nulla in ſuperficie conſpiciebantur flexuum aut aufractum veſtigia, ſed membranæ in modo et qua expanſio. Plenius vero detecto, quod intus erat, cavo, ex quo reliquia tum defluxit aqua, diſſectum cerebrum vix linea craſſius inveniebatur; et nihilo tamen minus interiorem medullarem portionem ſuus ubivis albor, ab exteriore cinnerea, quam corticalem dicunt, evidenter diſtinguebat. Fundus ſpatii, intro quod aqua ſtagnaverat in ventriculis cerebri lateralibus collectam illam ſatis manifeſtabat: ſed a ſolita ſpecie admodum differebat, depreſſa colliculorum figura, et thalamis nervorum opticorum ita ab invicem deductis, ut mox in conſpectum caderet commiſſura, quam dicunt, cerebri anterior; tum et fibrillis irregulariter poſitis, quæ ad cognitas partes, et ſuis diſtinctas nominibus, referri non poterant. Circa nervorum aut origines nihil animadvertebatur inſoliti, neque circa cerebellum aut medullam oblongatam. Ultra rem ſcrutari, diligentiori digniſſimam contemplatione, tempus et circumſtantiæ prohibebant. Neque diſcerni juſte poterat, e lateralibus ne cerebri ventriculis, per tertium in quartum, atque ſic ulterius in ſpinæ dorſi canulem, ante diſſectas, et tum inundatas partes, aqua deſcendiſſet, ſummam licet habeat veriſimilitudinem, per apertas ſano in ſtatu vias debuiſſe deſcendere.

tion, merely, is in this, as in all cafes, an excitement, and that when the diftention is from within, from an idiopathic hydrocephalus, the bones, though often not

Calvariam etiam adhuc, dum fuperfuerit, attentius infpicere licet. Tantæ eft amplitudinis portio fuperior fomicata, quæ cerebri contemplandi gratia, confueta fectione, proxime fuper oculorum foramina fummafque partes futurarum fquamofarum, ab inferiori feu bafi, fuit fejuncta, ut aquæ novem libras ceperit; quum fimiles portiones, ex calvariis hominum adultæ ætatis et confpicuæ fimul ftaturæ, libras vix capiant quatuor. Sic diftenta, perfectam quoque formam ufque eo deferuit, ut aliqua ex parte contrariam receperit. Capacior enim multo, omnem demenfionem, ad finciput et frontem, quam ad occiput eft; ita ut qui levius, vel oculo minus perito, adfpexerit, priora verfus pofita fuiffe judicet, quæ pofteriora fpectarunt. Latiffima eft, qua offis multiformis proceffus offibus frontis et verticis fe annectunt; inde fenfim primum auguftata, ad occiput multum contrahitur: frons protrufa valde ante oculorum cava, non depreffa illa, qua folet acclivitate, fed altiori multum ductu ad finciput affurgit: latera minus quam in adultis fanifque compreffa funt, et lacunar ipfum admodum fupra ordinariam altitudinem eminet, in futuræ coronalis medio altius aliquantum reliquo, ita tamen, ut per fummæ longitudinis magnam partem eadem fere regnet altitudo; ceterum ad fphagiæ convexitatem undique accedit, ut, quæ alias in offibus verticis exftant, tubera non deprehendantur. In qua deformitate, ut melius pateat, quibus in locis a confuetudine naturæ longius recefferit, fequentes notavimus menfuras, tum in morbofa quam defcribimus calvaria, tum in binis calvariis fimiliter fectis, et illas inter, quæ ad manus funt, majoribus.

	In calvar. morbofa.
Convexitas, a glabella hoc verticem ad locum appofitum occipitis,	147
Convexitas lateralis futuræ coronalis,	132
Convexitas fuper gibbofitates off. vertic.	136
Circumferentia,	220
Altitudo Maxima,	50
Axis Sectionis Major,	70
Axis calvariæ maxima inter medium frontem et occiput, præcedenti altior,	76
Axis Sectionis Minor,	53

Quarum menfurarum differentiæ, fi cum menfuris perfectæ ftructuræ conferantur, patebit, ad fuperiora præcipue, et maxime quidem ad priores horum partes, diftenendi vires fuiffe directas. Craffitie a calvaria mulieris robuftæ vix differt, craffiffima item illis in locis ubi perfecta ftatura poftulat. Tota vero futuris claufa eft, immo alicubi offibus in unum confolidatis. Sutura coronalis integrum ambitum fervat, fed tota officulis referta, exiguis quidem ad latera et firmiffime cohærentibus, majoribus autem ad finciput et laxius connexis, ut diftincta offa referant. Verticis offa, dimidia fua contactus parte, eademque priore, in unum prorfus coaluerunt, et æquabiliffimum, tam intrinfecus quam extrinfecus, exhibeant fuperficium; reliquam et pofteriorem partem futura diftinguit laxa denticulis facta exiguis, a cujus extremo fuperiori dextrofum et retrorfum fimilis excurret futura, in ipfo primo offe finiens: Lambdoidea tota fupereft, itidem officulis plena, admodum quidem exiguis in inferiore utrinque parte qua ad fquamofam accedit: a convexitate vero hujus futuræ, binæ aliæ in verticis offa excurrunt, una utrinque quarum quæ dextra eft, directione refpondet futuræ illi modo memoratæ a fagittali retrogradæ, ut his tribus futuris diftinctum includatur os, quatuor pollicem longitudine, exigua fui portione cum verticis offe dextro coalitum. Squamofas conglutationes officula formabant minutiffima, numerofiffima, ut fub maceratione, ab uno latere contineri omnia fcio fitu non potuerint, fed decidua majores reliquerint hiatus.

close in their sutures, nor firm in their texture, grow to an enormous size. Of a child, for he may be called a child, fifteen years of age, whose cranium has expanded to an enormous size, with bones of great size and solidity, I have here given a correct drawing, with a short description of the case.

OF INJURIES OF THE SCALP.

LET us then turn from relations extraordinary, and almost incredible, insolated, as it were, by their magnitude, and therefore ill suited to form precedents, to facts of daily occurrence, and plainly useful, the examination and detail of which may ripen your judgement, and qualify you for practice. The most extensive lacerated wounds, and widest fractures, are less dangerous than the slightest bruise of the scalp, or contusion of the scull; a truth which should awaken your attention to every doubtful appearance, and slighter sign of danger; and lacerations of the scalp very generally prove the doctrine which we have just laid down, that the natural powers are sufficient for almost every exigency, and that it is easy, however extensive the separation, to re-establish the connection of the scalp with the scull. The tyro in surgery must not only be convinced from hypothesis, but remember by the direct inference from facts, that the largest flaps of lacerated scalp are easily re-united with the remaining scalp, and with the bone.

The most extensive laceration, and the first I ever witnessed, was that of a servant, who, in riding a pair of wild horses to water, was unable to command them; they turned furiously, and galloped under an arch; he laid his head down by the neck of the horse he rode, but too late to escape the blow; the sharp end of the stone, catching the scalp obliquely on the right side, cut it up with an incision as clean as that of a tomahawk, and whirled it back over the occiput and left ear, uncovering much of the right, and the whole of

Scceletum reliquum totum ætatem mulierculæ bene adultam satis testatur, quum epiphysium ne minima quidem ulibi superfint vestigia. Spinæ dorsi duplicem in latera flexionem sequitur ligamentorum intervertibralium tenuitas, a parte flexuum concava, crassities, a parte convexa; quarum utraque, ut ipsa vertebrarum e justo situ deflexio, per gradus increscit decrescitque.

Ossium majorum quæ artus formant, contorta illa figura, quæ supra dictæ membrorum deformitati respondeat, hoc in loco descriptionem non postulat, quum a primo malo, quod capitis erat, minime pependerit.—*De Hydrocephalo Interno, Annor.* 45, *Præside Samuelo Aurivellio respondens. Elmark, vid. Sandifort*, tom. xi. p. 328.

the left parietal bone. In former times, extenſive as this flap was, it would have been cut entirely away, to make room for dreſſing and exfoliating the naked ſcull. This man was not treated ſo coarſely, yet not judicioufly; his head was wrapped in a poultice; when I ſaw it, the ſcalp was retracted, and curled up, and thickened, ſo that it never could be unfolded again, nor be made to cover the whole of the expoſed bone. But, by careful treatment, it adhered to the parts below, the interſtice betwixt the edges was filled with granulations, and healed; but never did this man recover his health. From being full, florid, chearful, and happy, he became poor, emaciated, hypochondriacal, and ſickly; he imagined every poſſible diſeaſe, and had indeſcribable ſenſations in the ſcalp, ſuch as excited in my mind the firſt apprehenſion of ſome permanent diſeaſe in the ſcalp itſelf, independent of any in the bone, or within the head.

However extenſive the laceration, if the ſcull be uninjured, the ſcalp not irrecoverably bruiſed, the patient in health, and not expoſed to contagion or fever, it may (with only ſlight and partial interruptions) be made to adhere again to the bone. Of ſuch recoveries, every practical ſurgeon has ſeen examples, and many intereſting caſes, made remarkable by the circumſtances of the accident, are recorded. —" A brick-layer, of about ſixty years of age, walking incautioufly along the ridge of a houſe two ſtoreys high, in order to lay ſome chimney-ſtones, in coming down again, he ſet his foot ſo inſecurely upon the firſt round of the ladder, that he miſſed his footing, and rolled down the tiles into the ſtreet. He fell from the height of two ſtoreys, and his head lighted ſo exactly betwixt two great ſtones, that it was wedged faſt betwixt them, without ever touching the ground, and the ſcalp, torn in the middle, (in its whole length from the forehead to the occiput), was divided into two great flaps, which were whirled down over both ears, the laceration being fully a foot in diameter. The man vomited the breakfaſt which he had juſt taken, lay convulſed in a very extraordinary manner, and was ſeized with a delirium which laſted four days, during which he ſtruggled with ſuch violence, that it was with great difficulty they got his hair cut and ſhaved, or the wound dreſſed.

" The whole ſcalp was inverted in a frightful manner, and almoſt the whole ſcull laid bare. The occipital bone, although that was the only place where there appeared no outward injury, was depreſſed. Monſieur La Motte, who was called to this man, waſhed his wound with ſpirits of wine, brought together the mangled ſcalp as well as he could, and, in oppoſition to the prejudices of all former times, and the univerſal practice of his own, covered the naked ſcull with its ſcalp,

and ſtitched the flaps together with points of the interrupted ſuture, all but one corner, which hung down over the temple, ſo ragged and bruiſed, that its ſtructure ſeemed ruined, unfit to bear the ſtitches of the needle, incapable of re-union, and ſure to fall into ſuppuration, or rather gangrene. This he was forced to cut away, but the reſt he brought ſo cloſe, as to leave uncovered a ſpace of four fingers-breadth only on the top of the head, near the meeting of the coronal and ſagittal ſutures.

This wound, great and dangerous as it was, accompanied with depreſſion, vomiting, delirium, convulſion, and every unfavourable ſign, Mr La Motte acknowledges that he might have cured it in the end, and without delay, but for ſome taint of the ſcholaſtic learning of the times, and bad leſſons learnt in the Hotel-Dieu; for, when he ſaw the cranium bare, he could not refrain from aſſiſting nature; nature had formed theſe granulations which were deſtined to re-unite the bone and the ſcalp, but he would have a previous exfoliation of the bone; and, while he was thus inclined to a regular exfoliation, and nature to a more ſimple and expeditious cure, the reſult could not be in favour of the patient. "Every morning (ſays La Motte) I found this naked part of the cranium covered with fungous fleſh, which, at each dreſſing, I ſcraped away in vain; nor did even my deſiccatives hinder its ſpringing up from day to day, till I found myſelf obliged to abandon this deſign, and dreſs with ſimple lint, never imagining that this neglect could be followed by any kind of danger. But, after dreſſing thus for fifteen days, I found the expoſed bones exfoliating. When the exfoliations began to project in the diſtant points through the fleſh, I pulled them away ſucceſſively.

"The cure I finally accompliſhed by five months careful dreſſing. During three of theſe months, the man was obliged to refrain from work. But he lived, after his cure, ten years, and worked at his trade to the day of his death. Lingering as his cure may appear, it was, nevertheleſs, abridged by the ſewing of the ſcalp, without which I have every reaſon to believe it would have been protracted for a year*."

* Cette portion du crâne qui étoit découverte, et qui occupoit, comme j'ai dit, partie des ſutures, ſe trouvoit tous les matins recouverte des chairs fongueuſes, que j'etois obligé d'enlever a tous les penſemens, ſans que cela en empêchât la régénération, quoique j'y emploiaſſe les plus forts deſiccatifs. Je l'abandonnai dans la ſuite, ſans me ſervir que de la ſimple charpie ſeche, ne prévoiant pas que les ſuites de cette attention négligée dûſſent être d'une dangereuſe conſéquence. Aprés quinze jours de ce pauſement les os s'exfolierent; et les portions d'os s'étant élevées au travers de chairs, je les tirai en trois fois differentes, et à meſure qu'elles ſe préſentoient; ſçavoir une portion du pariétal droit, une plus grande du gauche, mais une encore plus grande du coronal, étant elle

But I fear La Motte might have added, with equal truth, " Nay, it might have been accomplifhed in a few weeks, could I have prevailed with myfelf to renounce the old rules, and refrain from impertinencies which could not but hinder the natural progrefs of the cure, by occafioning that dangerous and flow exfoliation of the fcull, which I am now perfuaded was the work of my own proper hands, of my fcraping irons, my deficcatives, my alum, lead, and white vitriol."

The cafe, as it ftands, is inftructive ; and the wound and the cure were fufficiently remarkable to attract, in a provincial town, (Valognes), the attention of the vulgar, high and low. The breakfaft of porridge which the man had rejected, while he lay in a ftate of ftupor, was miftaken for brain, and the flaps laid down over each ear made the mob imagine that his head was fplit like an apple. They believed in good faith that the fcull was opened, and the brain difcharged, and that the brain was baled back again by La Motte, with his two hands, into the empty fcull, which he then clofed up, and fewed firm with ftitches : What they imagined they faw, they reported with confidence, and " in many a company of polite and fenfible people, I was afked ferioufly, (fays La Motte), whether it could be that I had put back the brain before fewing the head ? which I anfwered according to the character of the inquirer, or humour of the moment, aye or no *."

La Motte, in all parts of his works, fhews much good fenfe and obfervation ; there is no innovation of which he feems more proud and confident, than this of preferving and replacing the fcalp, in oppofition both to the prejudices of his times, and to the rules of the great hofpital-furgeons, who feem to have been, from hurry or rudenefs, the great corrupters of practice ; indeed their flighteft errors, multiplied by the imitation and improvements of numberlefs pupils, became ferious and fyftematic faults of the profeffion. After reporting a cafe of lacerated fcalp, in which a gentleman, having fallen in his own ftairs, had his fcalp torn down in the exact likenefs of thofe incifions which we perform in diffection, when

feule plus éntendüe que les deux autres enfemble. J'achavai enfuite la guérifon de cette plaie, en continuant le méme paufement, qui dura cinq mois avant que la cicatrice fut ferme et folide, dont le bleffé en paffa trois fans pouvoir travailler de fon métier ; cependant ou peut dire que la cure fut fat abregée, par les futures que je lefi fis, qui reuffirent tres bien ; fans quoi il n'auroit pas été quéri dans le cours de l'année. Il a vêcu encore plus de dix ans depius cette bleffure, et a travaillé de fon metier jufqu'a fa mort. *La Motte*, tom. 2. p. 278-9.

* Je ne fus pas furpris d'entendre publier ces pauvretez à de fimples gens, qui ont beaucoup plus de crédulité que de raifon ; mais je le fus davantage de m'entendre demander par plufieurs perfonnes plus fenfées, fi cela étoit véritable ; aux unes, je répondois oui, et aux autres, non, fuivant que j'étois en humeur de rire ou d'être ferieux. *La Motte*, p. 282. tom. 2.

we deſign to ſaw the ſcull-cap *; and in which, notwithſtanding the extent of the laceration, the looſeneſs of the flap, (which hung ſo low, that the garcon held it ſtretched in his hands till the hair was clipped and ſhaved), and its being engrained with ſand, La Motte made a perfect and ſpeedy cure by ſtitching it. He adds a ſpecimen of a very different practice, for, having been called by a country-ſurgeon to aſſiſt him in the cure of one who had a ſimilar wound of the ſcalp, uncovering the whole of the left parietal bone, he found that this ſurgeon, who had wrought long in the Hotel-Dieu at Paris, and ſeen Petit cut away every looſe portion of ſcalp, imitated unrelentingly his celebrated maſter, and cut this flap ſo clean away, as to uncover the whole parietal bone, and protract a cure to ſix months, which might have been accompliſhed by a better method in as many days †.

Such has been the practice of Sharp, of Pott, of Deaſe, and of many hoſpital-ſurgeons; and it will not be unfavourable to your recollection of this plain and uſeful leſſon, that it is connected with ſuch a man as La Motte, and with the ſurgery of the laſt age. The recollections of his own faults ſeem to bear hard upon La Motte; he is not ſo diſingenuous or ungenerous as to diſcloſe thus the faults of others, concealing his own. He relates, in contraſt with his better method, learnt from experience and obſervation, his ill practices, when he firſt went out from the Hotel-Dieu. His firſt patient had been a young girl, with a ſimple wound in the forehead, whoſe cure he had protracted, and whoſe forehead he had deformed with an unſightly ſcar, by ſeeking to procure a regular exfoliation of the bone. "Woe be to thoſe (ſays La Motte) who ſerve as ſubjects of his firſt experiments to the young ſurgeon; ſuch was the ill-fortune of my firſt patient, for, being juſt come from the Hotel-Dieu, where I imagined I had learned every thing, I began by dilating the wound with tents, hard and firm as I could make them, with the deſign of keeping the bone open, till it ſhould caſt off its ſcale, fearing the worſt conſequences, ſhould I ſuffer the bone to be covered ‡." How

* "Je trouvai, (ſays La Motte), que le cuir chevelu etoit coupe de la meme maniere que lorſque l'on veut decouvrir le crane d'un cadavre," &c.

† Mais ce chirurgien qui avoit travaillé quelque peu de tems à l'Hotel-Dieu de Paris, ou il avoit vu Monſieur Petit couper les portions des tégumens, qui ſe trouvoient dilacerez ou ſéparez de la ſorte, pour éviter un plus grand mal, comme je l'ai dit ailleurs, voulut imiter cet excellent maitre, en coupant comme lui, la portion du cuir chevelu, qui étoit détachée, et il decouvroit par ce moien tout le pariétal, et par de-la. *La Motte*, p. 457-8. tom. 2.

‡ Malheur à ceux qui ſervent les premiers d'épreuve a un jeune chirurgien, telle que fut cette premiere bleſ-

unſparingly and unrelentingly he proceeded in this work of exfoliating the bone, he next repreſents to us in apoſtrophiſing the girl, in the true Gallic ſtyle. But this reformation in his practice, which had enabled him to ſave others from the like deformity and pain, ſeems to have given him real pleaſure, as a man proud and zealous in his profeſſion.

There is another maxim I would impreſs upon your minds, that the ſurgeon muſt not preſume to decide, *a priori*, what parts of the lacerated integuments may be re-united, and what parts are unfit to be ſewed, for that is a problem which never can be reſolved but by the iſſue of the caſe. A piece of ſcalp, though irrecoverably bruiſed, cannot (though replaced, as if with hopes of its adhering) do the ſmalleſt harm to the ſcull; and we have innumerable proofs, that teguments, much lacerated, may retain their life and circulation, and that although foul with ſoil and ſand ingrained into them: ſo that even in ſuch caſes we need not ſcruple to put the uſual ſtitches into the wound, as I did, (ſays Paræus), "in the caſe of a ſoldier wounded at the Caſtle of Hedin, a little before the laſt ſiege. This ſoldier was employed, with many others, in digging earth to carry to the ramparts. The earth falling in upon one party of them, many were ſuffocated and cruſhed to death, while this ſoldier was dragged out from among the rubbiſh alive, with his ſcalp bruiſed and lacerated, and torn down from beyond the top of his head, and hanging ſo over his face, as to ſtrike his companions with horror. When I ſaw him, I called Charles Lambert, ſurgeon to the deceaſed Duke de Bouillon, to aſſiſt me. I waſhed the wound in warm wine, both to cleanſe it of the coagulated blood, and waſh away the earth; then it was well wiped and dried with a linen cloth. There was applied over the whole wound ſpirits of turpentine, with an admixture of ſpirits of wine, in which ſanguis draconis, maſtich, and aloes were diſſolved; then the flap being replaced, was ſecured with ſeveral ſtitches of the needle, (not firmly drawn, for fear of inflammation and pain, which is moſt apt to occur at the time of the firſt ſerous effu-

ſée a mon égard; car ſortant de l'Hotel-Dieu de Paris, ou je croiois avoir tout appris, je commençai à élargir cette plaie avec pluſieurs bourdonnets fort durs, dans l'intention de tenir cet os découvert juſqu'à ce qu'il fut exfolié, croiant bien faire, et prévenir le mal que je craignois, ſi je laiſſois recouvrir cet os; *mais combien n'en cauſai-je point a cette pauvre enfant, qui me le faiſoit aſſez entendre par ſes larmes, que je regardois impoitablement, dans l'eſperance d'un plus grand bien;* mais je ſous m'en corriger, comme je le fais voir par la maniere dont je la traiteri la ſeconde, à laquelle il n'eſt reſté qu'une ſi foible marque, qu'a peine s'en peut-on appercevoir; au lieu d'une cicatrice difforme reſtée à l'autre qui n'auroit paru en aucune maniere, ſi j'avois ſuivi la même méthode. *La Motte*, tom. 2. p. 445-6.

ſion), to unite the parts, and ſave them from the contact of the air." Some of the other precautions of Paræus were leſs conſiſtent with ſound principles, or modern practice; for he put into each edge of the lower part of the wound long tents, to preſerve a free diſcharge of the matter, which could not but tend to inflame the wound; and it is not eaſy to conceive how the upper end of a wound like this ſhould adhere, while its lower part was thus tortured into a ſtate of ſuppuration; beſides, there was laid over the whole head a poultice of bean and barley meal, mixed up with vinegar, while it ſhould have been kept clean and dry. "I adviſed him (ſays Parée) to retreat to Abbeville, as the enemy was prepared to beſiege us; and you may be aſſured, that after having been exchanged from my impriſonment, (for I fell into the hands of the enemy), I ſaw this ſoldier in Abbeville in perfect health."

The circumſtances of a caſe related by Mr Hill are ſo particular, that you will naturally take an intereſt in it. While the older ſurgeons cut away every portion of ſcalp, however ſlightly or partially detached, our practice is to replace confidently every lacerated ſcalp, however much inſulated, mangled, or polluted with ſoil or ſand. The caſe related by Mr Hill will leave always upon your minds a lively recollection of the fact.

"A drunk country-man, aged ſixty-ſix years, riding furiouſly along the ſtreet, was flung with ſuch force againſt the ſharp edge of a door-poſt, that about the length and breadth of a hand was ſtripped off the right ſide of his head, and laid down on the cheek.

"Some people, in the dark, took his wig out of the kennel, and, not knowing what had happened to his head, put it on full of mud, and ſqueezed his hat over it. He did not complain of his head, but complained greatly of his neck and ſhoulders.

"The dirt was rubbed into the TUNICA CELLULOSA in ſuch a manner, that it was impoſſible to clean it fully out. I therefore pulled up the looſe piece of the ſcalp, and, after waſhing and ſtuffing it with ſoft liniments, put four ſtitches into the upper part, but ſo looſely, as to allow the matter a free paſſage.

"The wound digeſted ſo well, that in five days all dangerous ſymptoms were over, and his friends carried him home without acquainting me. Having no proper perſon to take care of him, the ſtitches gave way one after another, and it healed, leaving near two fingers-breadth of the ſcull bare, the teguments lying in folds on the OS PETROSUM. This circumſtance might eaſily have been prevented by renewing the ſtitches. He, however, lived and enjoyed good health above twenty years."

Yet a laceration of the ſcalp is a ſtate of danger and uncertainty. We never can be aſſured that the bone is not too much injured to admit of its re-uniting with the ſcalp, or that the conſtitution is not too weakly, or the ſeaſon or the air unfavourable; we never can be aſſured, even when the proſpect at firſt is moſt flattering, that a laceration of the ſcalp will not be followed by a ſuppuration of the brain.

" Thomas Sharpe was an itinerant dancing-maſter, a fidler, a performer in a military band; he died trumpeter to the Dumfriesſhire militia, and had attained to all the perfection of libertiniſm, and diſſolute behaviour, that ſuch occupations naturally entail upon their profeſſors. One morning, reeling out of a low tavern, he, after ſcrambling up the ſtairs of it, ſtaggered forwards into the unguarded area of a houſe that was building, and, without any other apparent injury, had his ſcalp torn down over his face. The ſcalp was ragged in its edges, and mangled every where, with ſeveral penetrating wounds; it was ſeparated from the whole upper part of the head, from the lambdoid ſuture, backwards nearly to the eye-brow, and from the vertex to the right ear; much of the ſcull, and eſpecially of the os frontis of that ſide of the head was laid bare; nor was the oppoſite ſide without bruiſes, and leſſer wounds, for it ſeemed to have been jammed in among the looſe ſtones.

" The ſcalp was ſponged, cleaned, and dried, and ſmoothly applied again to the ſcull; and as the edges of the laceration were irregular, and bruiſed, and in no fit condition to be nicely joined with ſtitches, they were held by plaſters only, they were united in a few days with each other, and even ſeemed re-united on the lower ſurface with the ſurface of the ſcull; whatever inflammation there was, ſeemed a very natural conſequence of the general bruiſes, and leſſer wounds of the ſcalp; and we were confirmed in this good expectation, from the man's having recovered from his intoxication, and continuing in apparent health. He felt his bruiſes, and complained of the pain, ſlept well, had neither delirium, ſickneſs, nor fever, and was bled only on account of the fulneſs of the pulſe.

" On the fifth day, the little diſcharge which iſſued from the irregular openings, and ſmaller wounds, was good; the adheſion continued apparently ſound; on the ſixth, the diſcharge from under the ſcalp was more copious, and compreſſes ſoon were nicely applied to keep the ſcalp and the ſcull in contact with each other. On the eleventh day it became neceſſary, from fluctuation and ſoftneſs in all the lower part of the detached ſcalp, to make an opening over the ear for the diſcharge of matter, which flowed ſo profuſely, and was accompanied with ſuch fits of rigor, that I abandoned all hopes of any firm or general re-union, and began to fear that the brain was

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HEAD OF THOMAS SHARPE:

Fig. 1. Sketch of the Scalp partially reunited.—A large Abſceſs above the Ear diſcharging a profuſion of Matter. —*bb* Extent of carious Bone and dead Scalp.—The Probe paſſing from the Opening *c* and *d* out by the Opening *e*, and all round from the Vertex to the Temple and Ear, betwixt the Scalp and the Bone.

Fig. 2. The Integuments laid back, and the Extent of carious Bone expoſed. —*ff* Marking the Extent of the Caries.

Fig. 3. Drawing of the Scull-cap ſawed off and preſerved.—*g* Marking the Center of the Caries.—And *hh* The deep ulcerated Furrow in the Bone by which the carious Part was circumſcribed, and which might have been miſtaken for a deep Fracture.

in a ſtate of ſuppuration. Upon puſhing the probe through the ſoft and downy granulations which united the edges of the ſcalp with the ſcull, I was perſuaded, that all below the mere edge was diſengaged, that the whole extent of the parietal bone was rough and naked. The probe, in its progreſs between the ſcull and integuments, encountered what all my aſſiſtants conceived to be a fracture of the ſcull; yet ſtill the patient retained his ſenſes, and ſuffered little in his health.

"The ſymptoms of ſuppurated brain are, I know from much experience, far from alarming when they firſt appear: The detached ſtate of the ſcalp, the roughneſs of the bone, the profuſion of matter which flowed through all the openings, and the ſlight rigors, dejected looks, and tremblings of the hand and tongue, though they are ſuch as alarm the ſurgeon, can hardly vindicate him in taking any deciſive ſtep. I was perſuaded that the bone was dead, and the brain in a ſtate of ſuppuration: I ſaw no proſpect of interpoſing with ſucceſs at ſo late a period as the ſixteenth day from the injury; I was ſupported by the conſulting ſurgeons in the preliminary ſtep of opening the ſcalp, and expoſing the diſeaſed bone; but they ſeemed to ſuffer a diſappointment, when that rough line, which was ſo curiouſly traced with the probe, was found not to be a fracture, and, as there was no fracture, I was, fortunately for my reputation, prevented from applying the trepan; for though there was every motive for operating, the patient died next day of a diſeaſe, inevitably fatal, connected indeed with the accident, but having no relation to the ſtate of the brain.

"Let me now, then, proceed to give you an account of the condition of this man before the operation, of the manner of his death, and of the appearance on diſſecting the body. Before the operation of cutting up the ſcalp, there were no deciſive ſigns, nor fatal prognoſtic; for of all the fatal affections of the brain, this of ſuppuration of the dura mater is the moſt inſidious in its progreſs; and our patient, before we apprehend him to be in danger, is in general beyond the reach of help. This man, though he had the cranium naked, the ſcalp in full ſuppuration, and a profuſion of thin matter pouring out from various openings, had no other ſymptoms than ſlight rigors, and no more violent rigors, indeed, than often accompany the ſlight fever of a lacerated ſcalp. It was towards the ſixteenth day, perhaps about the fourteenth, that theſe rigors were followed with a ſweating ſtage, that they became ſenſibly more frequent and violent, and that they were accompanied during the day with unuſual languor, and in the night with a ſlight delirium, which only diſappeared when he was thoroughly rouſed from ſleep. Yet, at this moſt critical period, I could not make him ſay that he had any corded feeling over the brow, any headach, any thing which might indicate to his

own apprehenſion a diſorder within. I could not perceive the ſlighteſt wavering in his intellect; I could not find, in the irritable ſtate of his pulſe, the foulneſs of his tongue, the dullneſs of his eye, in his perturbed ſleep, and alarming dreams, any thing more than the feveriſh diſorder naturally accompanying ſo extenſive a laceration of the ſcalp; and yet at that moment was the ſuppuration of the dura mater fairly eſtabliſhed, and the brain itſelf deeply tainted.

"An increaſed drowſineſs, with rigors more violent than uſual, a degree of headach, and a ſenſibility to light, induced us, upon the ſixteenth day, to cut up the ſlight adheſion of this great flap of ſuppurated ſcalp, which immediately fell over the ear, and left the whole parietal bone expoſed, in a condition perfectly deciſive, in my opinion, of the ſtate of the brain, and indeed of the patient's fate. There was a portion of the parietal bone broad as the palm of my hand, of a ſquare form, apparently inſulated from the reſt, black, carious, and elevated above the level of the ſurrounding bone, and circumſcribed by a line as deciſive as if it were a fracture. This part, which was the centre of the parietal bone, was rough, dry, and prominent, of a dark yellow colour, engrained with black ſpots like a toad's back. The pores of the bone, or, in other terms, the minute and almoſt inviſible holes by which the blood-veſſels enter it, ſeemed wide, and not red as when blood is circulating, but black. In the margin immediately ſurrounding this, where the bone was ſtill alive, and in a ſtate of ulceration, the bone was waſted, ſo that the carious part was left prominent, with a line ſo fairly circumſcribed, that, when felt with the probe, it might be miſtaken for fracture; this is indeed, uniformly the condition of a dead and exfoliating piece of the ſcull. Beyond this ulcerating circle, where the integuments and muſcles adhered, they adhered with particular firmneſs, being crammed with extravaſated blood, and hardened by inflammation. Though the certainty of the brain being in a ſtate of ſuppuration, inclined me to perforate the cranium, the certainty now of there being no fracture inclined my aſſiſtants, and the conſulting ſurgeons, to refuſe their conſent to that operation, which alone could ſave our patient; thus I was deſtined to eſcape the opprobrium of having ſhortened the life of a man, whoſe death, from a very different cauſe, was inevitable.

"He was perfectly ſenſible during this preliminary operation, and would moſt willingly have conſented to any meaſure we might judge expedient. But, when he was conveyed to bed, he ſeemed weak, his breathing was low and difficult, his pulſe, which had beat 124 in the afternoon, was this evening extremely feeble and ſlow, and he broke out into a very profuſe ſweat. His features were ſhrunk, and

his face pale and ghaſtly. About four in the morning he was ſeized with ſickneſs, and ſevere vomiting, and with a rigor, which laſted fully twenty minutes, and at eleven in the morning his breathing was extremely oppreſſed; it was painful to witneſs his ſtruggles for breath, and the anxiety and cold ſweats which it brought upon him: in half an hour after his moſt violent ſtruggle for breath, he was ſeized with a profuſe hæmorrhage from the lungs; brought up, with coughing and ſtruggling, fully a pound of florid blood, and expired: Thus, in the very moment in which he came into manifeſt danger from ſuppuration of the brain, he died from the burſting of a blood-veſſel in the lungs. What bruiſes, beſides the wounds of the head, he may have received unconſciouſly in his ſtate of intoxication, we do not know; but nothing is more likely, than that in the fall which thus hurt his head, the lungs had alſo ſuffered material injury; it is perhaps from ſuch injuries paſſing unnoticed that ſuppuration of the liver ſo frequently accompanies fractures of the ſcull; indeed, I know not how a man can fall from a height, without ſo heavy a viſcus as the liver ſuffering by the ſhock, independent of any direct blow.

"The appearances on diſſection were as follow: The appearance of the brain implies danger; but it was the diſſection of the lungs that explained his ſudden death. Upon raiſing the cranium, all that ſurface of the dura mater which lay under the diſeaſed bone was in full ſuppuration, covered with white and mature matter, and, in many points, perforated with ulceration. The pia mater, in contact with the diſeaſed dura mater, was not yet ulcerated, for the brain cut ſound and firm up to the very ſurface; yet the whole maſs of the brain was in ſome degree affected, an increaſed action of its veſſels had unqueſtionably taken place, for all the ventricles were enlarged, and full of ſerum, but not obviouſly inflamed. Thus our patient was in that ſtate of danger from ſuppuration of the brain, from which ſo few are recovered even by the moſt timely operations; but the ſudden burſting of a great veſſel in the lungs was the immediate cauſe of the death; for, upon opening the right ſide of the thorax, there was found in the lungs of the right ſide a great effuſion of blood, and a ſmall ſuperficial ulcer on the largeſt lobe of this part of the lungs.

Whether is it to the mere laceration of the ſcalp that we are to refer all this diſorder? Was the ſcalp ſo mangled by the ſharp and irregular ſtones among which this man had fallen; was it perforated in ſo many places by theſe irregular wounds I have mentioned, as to deſtroy its texture, and make it no longer capable of maintaining

its connection with the ſcull? Or, was the bone itſelf ſo much injured in its internal ſtructure and circulation as to be incapable of puſhing out granulations to meet thoſe of the ſcalp? Does not the practice here purſued, of holding the ſcalp in its place, of ſupporting partial adheſions, and endeavouring to extend them by uſing compreſſes, and confining the inflamed ſcalp in contact with the diſeaſed bone, tend rather to increaſe that inflammation, and indeed to widen the ſeparation? Were not thoſe ſymptoms of ſhiverings and languor which (ſlight though they be) indicate ſuppuration of the brain, too long neglected? Should I not, in place of making ſucceſſive openings, when new abſceſſes were generated, have thrown down the ſcalp to examine the bone? Should I not, according to the ſtrict rules of good ſenſe and good ſurgery, have proceeded to trepan a ſcull, carious to ſuch extent, unequivocally dead, quite incapable of maintaining any connection with the dura mater, ſure, on the contrary, to operate upon it as a foreign body, and to produce ſuppuration? For this was not one of thoſe circumſcribed and ſuperficial exfoliations, which can be thrown off without danger to the brain. Finally, ſince this patient ſurvived ſo horrible an injury for three weeks, and died by a ſort of accident, is not the long delay of this fatal ſuppuration a ſort of proof, that it happened not from primary ſeparation of the dura mater detached by the ſhock, nor by a ſecondary ſeparation depending on ſlow diſeaſe of the bone, but from this deſtruction of the ſcalp, followed in ſucceſſion by death of the ſcull, and ſuppuration of the dura mater, the internal perioſteum of the ſcull?

Though I regard every fatal cauſe as an occaſion of reflection, and almoſt of ſelf-reproach, yet I am ſenſible that this caſe was too complex not to admit of many apologies: There are in ſuch caſes of lacerated ſcalp certain irregularities and anomalies which incline me at all times to proceed with caution. There are conditions of the individual ſyſtems, and varieties of climate, or air, which, without any local cauſe, without the ſcalp or the ſcull being eſſentially ruined in their texture, prevent their re-union, and even occaſion death. The air of particular countries has been remarked through ages as peculiarly noxious to thoſe wounded in the head. Luſitani has celebrated "the noxious air of Florence and Bologna, while the air of Raguſa, ſeated upon a rock, is ſo extremely favourable, that even where the cranial bones are fractured and deſtroyed, hardly any patient dies, but all recover *"

* Florentiæ et Baroniæ ita capitis vulnera periculoſa ſunt, ut raro capite vulneratus ſanatur, &c.—*Luſitani*, cur. 100. c. 6.

In Africa, the climate was ſo ſevere upon the French army in their celebrated expedition under Charles V. the days were ſo hot, and the nights ſo moiſt and cold, that they were in the greateſt danger of being all cut off by fluxes, fevers, and ill-conditioned wounds. "Wounds in the head was very perilous in that place, ſo that if a hundred were hurt in the head, it was not poſſible to ſave ten; for the day was ſo hot that it burned all things, and the night was ſo extremely cold, that it was intolerable, and not to be credited, and ſo by this diſtemperance, when the cranium was uncovered, that the air might touch it, preſently they died without any help. Then I ſeeing that, began to conſider of the matter, deſiring to find ſome means to help them, and ſo ſtudying, it came into my memory, that the air was the cauſe of their death, as it was in truth. Then preſently I commanded all the ſurgeons that were under my juriſdiction, that they ſhould not meddle with any wound in the head without my preſence, which thing was done; and as many as were wounded, the firſt thing I did, inſtead of cutting or lancing, or diſcovering, according to the common order, I joined the parts! and ſewed them cloſe! and dreſſed them upon the wound with our quinteſſence, and with balſams, and with magno liquore, and in a ſhort time the moſt part were helped, and there died none ſo deſperate as before, *and*, *therefore*, (ſays Phioravanti, the author of this encomium upon his own practice), *in my judgement this was a good invention* *." Nor will any modern reader diſpute that it was, ſince, in place of the ſcholaſtic methods of incarning, exfoliating, and cicatrizing, Fiorovanti replaced the ſcalp, ſewed the wound, and dreſſed it cloſe with that admirable balſam, to the virtues of which he ſo proudly aſcribes his ſucceſs.

The air of a country changes from time to time, "ſo that now," ſays Donatus, "in our town of Mantua, four or five years have paſſed in which the air has been ſo malignant, that the ſlighteſt injury of the head has been fatal; but from the third year this tendency of the air (influxus cœli) began to decline, ſo that now ſuch wounds are without danger, and no one dies †."

The ill air of an hoſpital is more fatal to the re-union of the ſcalp, than either the bruiſing of the ſcalp, or the injury or contuſion of the bone. The air of the hoſpital, the Hotel-Dieu, in Paris, is more noxious than the climate of Cremona, Flo-

* This is the Phioravanti whoſe hiſtory and practices are mentioned in the Firſt Volume.

† M. Donatus de Variolis, cap. ii.

rence, or Mantua, and has been a matter of regret in all ages. The good old ſurgeon, Saviard, ſhows us what danger there is in making even the ſlighteſt inciſions, by a caſe inſtructive in many reſpects.

"Nurſe Bernard of the Hotel-Dieu, no more than twenty-three years of age, was ſtruck on the back of the head by the falling of a poll, ſet up for drying cloaths, and fell ſenſeleſs to the ground. Upon giving her a little eau de vie, ſhe revived, when there was obſerved upon the injured part a ſmall bump only, of the ſize of a nut, and without any wound.

"The ſame evening ſhe vomited, and was oppreſſed at intervals with a degree of ſtupor, which having continued during four days, we became anxious, (ſays Saviard), and reſolved to open the tumor, which was full of coagulated blood, the pericranium adhering ſoundly to the ſcull beneath. From this time forward ſhe had irregular ſhiverings, which laſted at each return four hours uninterruptedly; and during the ſeventeen days in which they continued, we reckoned twenty-five returns. Bleeding we were ſo little ſparing off, that in the firſt days of her illneſs we bled her no leſs than fourteen times in the arm, and once in the ankle; her vomiting continuing inceſſantly, accompanied with pungent pain in the region of the liver.

"After the ſeventeenth day, gangrene came upon the wound, which forced us to make repeated inciſions; bad ſymptoms continued, notwithſtanding, for forty days, and two months and a fortnight had expired before the wound cloſed. Nor did her ſickneſs end here, for ſhortly after the cloſing of the wound, her face was puffed up with an œdematous ſwelling, much ſerum running continually by the ears and noſtrils for fifteen days; deafneſs ſupervened, with lancing pains, and continued diſorder of the head; more than a pint of reddiſh matter flowed from the noſe, and a rheum inundated the cheſt, and threatened ſuffocation to ſuch a degree, that for a long while we looked for nothing but ſudden death. It were impoſſible to enumerate (beſides the twenty-ſix bleedings) the various medicines ſhe uſed; it was by the frequent uſe of aſs's milk that her health was at laſt reſtored. Her pains in the head continued for two years, with beating of the temples, which increaſed with every change of the weather."

"None but thoſe (ſays Saviard *) who have experienced the malignant influence of the Hotel-Dieu of Paris, (inconteſtibly the moſt crowded hoſpital in Europe), can

* Ceux qui n'ont pas l'experience des impreſſions facheuſes qu'un auſſi mauvais air que celui de l'Hotel-Dieu de Paris, qui eſt ſans contredit l'endroit de l'Europe ou il y a en tout temps un plus grand nombres des malades,

imagine the ill effects it has upon the conſtitutions of wounded patients, cauſing even the ſlighteſt wounds to become mortal. Thoſe who have never ſerved in this hoſpital will no doubt wonder that a ſlight contuſion like this, in which the bone was in no degree laid bare, ſhould be followed by ſuch a train of ſymptoms, while thoſe who have, will be little ſurpriſed with a ſcene they have witneſſed continually."

This hoſpital, mentioned in all periods as a moſt foul and peſtilential congregation of vapours, is now reformed; Saviard, the oldeſt ſurgeon of this hoſpital, whoſe works are come down to us, thus warns thoſe who may ſucceed him in his office. Parée, ſtill more impreſſed with the ſame danger, and ſtruck with the ill ſucceſs of thoſe operations, propoſed that an hoſpital ſhould be erected in the ſuburbs, in a more healthy air, for the reception of thoſe wounded in the head. La Motte ſpeaks with compunction and penitence of the bad leſſons he had learnt in the Hotel-Dieu, and of the ill ſucceſs proceeding from the malignant air. Petit complained of the mortality in his time, and Deſſault, the laſt ſurgeon of that hoſpital, found himſelf ſo unſucceſsful, that he renounced at laſt all thoughts of operating in fractures of the ſcull, and, with a few ordinary precautions and remedies, abandoned every ſuch caſe to nature.

Without having the misfortune to have ſerved in any hoſpital, where, to uſe the language of Saviard, "I ſaw innumerable victims," or, being driven to abſolute deſpair, like Deſſault, and abandoning all hopes of being uſeful in wounds of the head; I have yet learnt a degree of caution, with which I would fain impreſs you in your firſt conceptions; for of all the abuſes of practice, the moſt grievous to one who reflects ſoberly and modeſtly on what art can do, is the confident and preſumptuous hope which young men are too apt to indulge, of re-uniting every piece of lacerated ſcalp by the main force of ſutures, and relieving every ſymptom of oppreſſion, or ſlight delirium, or temporary fever, by trepanning the ſcull. I have often obſerved, that though the ſeaſon ſeemed favourable, the heat moderate, and the air of an hoſpital untainted; while other patients, and leſs important wounds, were recovering a-pace, and no ſign of infection could be perceived, thoſe wounded in the

peut faire ſur le corps des bleſſés pour rendre lesmoind res bleſſures mortelles, ſeront ſans doute ſurpris, qu'un ſimple contuſion à la tete, en laquelle l'os du crane n'a jamais etè decouvert, ait eſt ſuivée d'un ſi longue ſuite d'accidens; au lieu que tous ceux qui travaillent dans cet hopital n'en ſont point ettonez, etant ſans ceſſe les temoins des effets funeſtes de cet air pernicieux, et trops ſouvent meme du nombre des victimes expoſées à ſes inſultes à leur propre dèpens, &c.

ſcalp became, after a few days confinement, languid, feveriſh, and oppreſſed, and had every uſual ſymptom of an oppreſſed brain. Not to ſpecify innumerable caſes, from which my general obſervation is deduced, I have ſeen a boy whoſe ſcalp was lacerated ſo very largely, as to ſhew the ſcull naked, but uninjured, continue well, and free from fever or delirium ſeveral days, then ſeized with vomiting, like that of oppreſſed brain, with rigors and foul tongue, and rapid pulſe, and delirium. I have ſeen a boy lying in this doubtful and dangerous ſtate for fifteen days, the ſuppuration of the wound being interrupted, and its complexion as much affected as the general health; exhauſted by ſucceſſive paroxyſms of fever, and yet in no imminent danger. I have ſeen three ſoldiers hurt, in the confuſion of a fire, from bricks or beams falling on them, all the three wounded in the head, all ſeized at once with the ſame temporary fever and delirium, and yet not one of them in any kind of danger. I have often ſeen, in an aged perſon, where the ſcull was laid bare by a blow, the integuments ſlough entirely away, and fall off in cakes as black (to uſe the expreſſion of nurſes) as the ſoot on the pot, and, after an interval of imminent danger, in which even the outer plate of the ſcull has exfoliated, I have ſeen with admiration the ſcull puſh forth its granulations with ſuch vigour in extreme old age, (at ſeventy-five years of age), as to replace the ſcalp with a broad and firm cicatrix. Theſe accidents of fractured ſcull, or lacerated ſcalp, are frequent only in an hoſpital; and you will often obſerve your patient, whatever his age or conſtitution, attacked with ſickneſs and fever, which ſeems to imply danger, but which is to be cured by antimonials, opiates, and the warm bath. You will have the goodneſs, then, to believe, that this is no inſignificant vindication of my own conduct in an unfortunate caſe, but an independent, a neceſſary and a uſeful injunction to you: "Never permit yourſelves to be alarmed too much at theſe firſt ſymptoms of fever, nor hurried into any precipitate ſtep, for many have narrowly eſcaped the knife and the ſaw, the ſcalping proceſs, and the uſeleſs perforation of the ſcull, to whom, during the continuance of ſuch a temporary fever, the ſlighteſt of theſe operations would ſurely prove fatal *."

* I think it of ſo much importance to the young ſurgeon, to have theſe prudent maxims thoroughly eſtabliſhed in his mind, that I would rather err on the ſafer ſide, and ſhall tranſcribe one caſe from my books. The ſlow progreſs of the ſymptoms of ſuppurated brain has always ſtruck me as peculiarly intereſting, and the critical ſituation of the boy Tom Scott, which I am now to deſcribe, attracted my attention. "This was a fine boy of thirteen years of age, who having, on new-year's day, got into an empty hamper which was in a cart, the horſe running off, the hamper was canted out of the cart, and the boy toſſed like a cat out of a baſket. His

That aphorifm of Hippocrates, which relates to the fever of intoxication, may be transferred, without referve, to that accompanying wounds of the head. "If a man be fo intoxicated, as to lie fpeechlefs, and he be feized with fever, he is in no danger; but if not feized with fever, he dies the third day *." We may, with much greater truth, pronounce the patient fafe, who, having a wound of the head

fall was, of courfe, from a confiderable height, and his head lighted among broken bottles. A woman came out, took him in her arms, and carried him up ftairs; wafhed his clotted hair, and took a very motherly care of him, till Mr Cheine, junior, of Leith, came, and fewed a confiderable wound of the fcalp.

"But from this time he was fadly neglected, being fent to the hofpital, where I faw him firft on the twentieth day. On the eighth day, probably on account of ulceration of the fcalp, the ftitches had been cut out, and the wound thrown open; the cut, arching in a femicircular form over the parietal bone, was in a ftate of ulceration. The bone was bare in its upper part, and rough, and apparently carious to a great extent. Where the bone feemed foundeft, it was covered with that fine down of granulations which fprings from the furfac of a denuded bone, and which is eafily pufhed off with the probe. The edges of the wound of the integuments was bordered with the fame flat and gloffy granulation. The fcalp from the place of the cut, (which paffed in an arched form over the top of the head), was quite down to the ear, in a ftate of complete fuppuration. The fluctuation of matter was every where manifeft; the fcalp in many places as thin as parchment; the rednefs of internal ulceration, threatening to burft outwardly, was remarkable in many places. The greateft bag of fuppuration was immediately around the ear, and an opening was made with a bleeding lancet juft before the ear, by the fide of the temporal artery, from which a profufion of pus was difcharged; a fecond opening behind the ear was alfo neceffary.

"With fuch an extent of fuppurating fcalp and carious bone, the boy's condition feemed of itfelf extremely critical. But the fever and ficknefs had rifen, at the fame time, to an unufual height; I found him, on the twenty-firft, after thefe very neceffary openings, with a furred tongue, a rapid pulfe, beating more than 120 in the minute; his fkin parched, his thirft very great; the face not flufhed, but the eye heavy and oppreffed, and the pupil, (though in this I may have been miftaken, as he had a very large black eye), fomewhat dilated; his motions were peculiarly languid, and he laid his head, during the dreffing, very oppreffed like, on his nurfe's fhoulder. During the night he feemed flightly delirious, and at one time fcreamed out very violently, having taken a great alarm at the noife of coals being brought into the room. When flumbering, he mutters; when firft roufed, he talks incoherently; when held up for dreffing, and efpecially when tormented by the probings and incifions, his feelings and fenfes are acute, and his remonftrances and entreaties very fenfible.

"His fituation was, in every refpect, critical and intereffing. It is not difficult for one who has been attentive to practice, to diftinguifh the oppreffion and languor of fever from the ftupor and nervous affections of an ulcerating brain. I faw fomething in this boy's condition, which inclined me to treat his illnefs as a fymptomatic fever, and I hold this cafe to be no bad illuftration of the remarkable aphorifm above quoted, and of the application of it to injuries of the head; for ftupor accompanied with fever is void of danger, a flighter ficknefs and oppreffion, with more of nervous feelings, would have been to me much more alarming.

"I treated this as a fymptomatic fever, with antimonials, opiates, fomentations; preffed out the matter gently; dreffed the head lightly and carefully; the integuments fubfided, and adhered; the bone granulated, and united

* "Si quis, ex ebrietate, voce privetur, et ftatim fane ipfum etiam febris corripiat fanus fit; fi vero non corripuerit die tertia moritur." *Hippocr.*

has his delirium and vomiting explained by concomitant fever; while he who has ſlighteſt ſhiverings, a leſs perceptible oppreſſion, and no concomitant fever, is in a doubtful ſtate.

Two inferences, I believe, are now plainly eſtabliſhed. *1ſt*, That the ſcalp, though lacerated and ingrained with ſoil or ſand, will re-unite, in favourable circumſtances, with the ſcull, as with any ſoft part. *2dly*, That the circulation from the pericranium to the ſcull is ſo eſſential to its ſound and healthy condition, that often its violent ſeparation affects the whole circulating ſyſtem of the bone, occaſions its death, and endangers the brain.

That the mere ſeparation of the pericranium will effectually deſtroy the ſcull, is but too well proved by the practices of the older ſurgeons *. " Joannes Gometius de

with the edges of the wound. The various leſſer abſceſſes were conſolidated, and I had the pleaſure to find that I had calculated rightly; that this boy was ill only of the ſymptomatic fever of ulcerated ſcalp, and was, by prudent meaſures, ſaved from the knife and the ſaw. But, had a conſultation been called, he would have been trepanned; had he been trepanned, he muſt have periſhed. But more of this in a future diſcourſe.

* Quantum ſimplicibus capitis vulneribus, *in quibus cranium læſum non ſit*, loci ad aperiendum conſuetudo vulgata, contra id quod præcipimus, tum nocumenti, tum moræ ad ſanandum afferre poſſit, præter alia multa exempla, unum illud ſatis confirmat, quod in Joanne Gometio de Columbis Cazzallenſi editum eſt, qui Philippi Regis noſtri ſtipendiis terras monteſque mineralium inveſtigandi cauſa rimatur: is, dum alte defoſſo ſpecu una cum operario inquiſitioni ſuæ operam daret, ad conſpectam repente glebam, quæ meralli ſpecimen habere videbatur, manu tollendam ſeſe feſtinus demittit, quem ſocius imprudens librato jam atque improviſo ictu ligonis, altero dente oblique, ac non graviter percuſſit in dextra capitis parte, ſuper os quod laterale dicitur; nec vero vulnus ad cranium pertigit, neque ullam rupti oſſis ſignificationem dedit, quoniam revera os minime fuerat læſum. Huic imperitus chirurgus, vulnus adaperiens, vehementer auxit, crucemque tribus digitis quadratam incidit, et cranium ſatis pro arbitrio detexit; deinde multos dies digeſtivis, et oleo uſus eſt, adeo profuſe, ut ultra quindecim regios nummos oleo, et ovis adhibendis impendiſſe dictus ſit; ex quo evenit, ut non modo detecta cranii pars, ſed multo etiam major undique portio corrupta fuerit; tandem poſt alterum jam menſem, cum ego a D. Franciſco Mendocio, qui regis mandato metallorum rationibus et operibus curæque omni præerat, accerſitus, hominem vidiſſem, Llerenam, ubi publico ſtipendio medicam artem exercebam, adduci juſſi. Huic, cum ſatis magnam oſſis partem extrahere opus eſſet, quæ tamen anguſtiori vulneris apertione produci non poſſet, cumque ego tantumdem aperire recuſarem, orificium ad argentei nummi, quem regium vocant, magnitudinem trepanis feci, ita ut membranæ extarent, atque ea parte pus, quod intus corruptum erat, quodque in dies conficiebatur, purgari poſſet; atque ita balſamo illo a me deſcripto, et emplaſtro gummi elemii, et filis tam diu curationem proſecutus ſum, quoad inſtrumentis leviter quotidie expertus os ipſum circumquaque abſciſſum eſſe, et duram matrem ſuperinducta jam carne conſtare intellexi. Igitur ut os ipſum magnum minori multo foramine extraherem, inſtrumentum mihi ad trepani inſtar comparavi, quo foramen facerem, quantum ferreus fuſus fæminarum noſtratium facere poſſit; quo ferro contiguis ferri pertuſionibus in crucis modum os totum corruptum perforavi; opus autem ipſum a medio loco inceperam, qua ſuperius vulneris ipſius oſculum patebat, quod ad argentei nummi magnitudinem paraveram. Foraminum vero intercapedinem, levatore dicto inſtrumento interrupi; facile enim os ipſum

Columbis of Cazzalla was appointed by Philip, King of Spain, to ſearch for precious metals and mines. While employed with one of his miners in digging a cavern, he ſtooped to pick up what he imagined to be a lump of ore; and the workman, having his ſhovel at that moment lifted, and in the act of ſtriking, hit him obliquely, and rather ſlightly, upon the right parietal bone; but the wound did not penetrate to the bone; there were not the ſlighteſt ſign of fracture; the ſcull, indeed, was unhurt. A rude and unſkilful ſurgeon enlarged the wound by crucial inciſions of four inches long, laid bare a great portion of the ſcull, and dreſſed it with oils, and digeſtive ointments, and turpentines, and waſted an incredible quantity of eggs and oil, for which he charged fifteen crowns; by which art and ſkill, the ſcull became completely carious, not only where it was laid bare, but to a great extent.

"A month after, I was called, in the courſe of my public duty, (for I was a ſalaried ſurgeon), by Franciſco Mendocio, maſter of the mines, to viſit this perſon. I found reaſon to remove a large portion of the corrupted bone, for which there was no adequate opening: I therefore made, with trepans, an opening, the ſize of a crown, ſo as to expoſe the membranes, and allow the pus already collected, and that which was daily formed, to eſcape, and, by dreſſing daily with the proper balſams and plaſters, I ſucceeded at laſt in inſulating and ſeparating the corrupted bone, when the dura mater appeared covered with granulations. But there remained much corrupted bone to be extracted through a comparatively ſmall opening. I ordered an inſtrument to be forged, a ſort of trepan, calculated to make an opening equal in ſize to that of our women's ſpindles; and having with it

rumpenti cedebat. Hæc ubi jam expedieram, unam primum ex his quatuor portionibus inſtrumento attollens extraxi, et alteram deinde, et tertiam; quartam, quæ maxima erat, in poſterum diem reliqui, quam tandem extraxi. Totum autem os laterale appellatum, et petroſi etiam ejuſdem lateris bona pars, et coronalis quoque non exigua portio, quæ in anteriorem partem vergit, extracta eſt; ex petroſo prodit quantum fere ad auriculum originem extenditur. His autem oſſibus extractis, dura mater, quæ jam interim inducere carnem cœperat, ultra modum etiam induxit, adeo ut exuperantem carnem ex orificio illo, quod jampridem feceram, bis fuerim coactus reſcindere; adeo autem duram experiebar, ut forcipibus vix poſſem reſcindere. Poſt hæc autem cum melius habere ſtatim cœpiſſet, Cazzallam diſceſſit, a quo poſt menſem fere accerſitus ſum, quod in capite ſuper occipitis ipſius os magnum tumorem ac pure etiam plenum haberet; quem cum aperuiſſem, oſſa multo etiam magis, quam quæ predicta ſunt, corrupta eſſe deprehendi; tum vero Llerenam ad me venire juſſu, poſtera die ſatis ex arte ſubtiliter oſſa extraxi, tria etiam prædictis æqualia, ſed multo magis corrupta. Relictus autem eſt toto fere occipitis oſſe carens, atque portione etiam non exigua alterius lateris oſſis ſiniſtri, vulnera autem ipſa carne et cute undiquaque obducta ſunt; molli tamen et tactui cedente conſtitutione, quæ paulatim dureſcit. Homo autem ipſe divino beneficio liberatus bene habet.—*Arcæus de Curand. Vuln.* lib. 2.

made two direct and crucial lines of contiguous perforation across the centre of the corrupted bone, and beginning my work of burſting up the carious parts at that central opening which I had already made, I broke bridges betwixt the perforations, the corrupted bones giving way eaſily before the force of the levator, and, having raiſed and removed ſucceſſively the firſt, ſecond, and third quadratures of this carious circle, I left the fourth, the largeſt portion, to be ſeparated on the following day; and thus I ſeparated the whole of the parietal, much of the frontal, and all that part of the temporal bone which lies above the ear.

"Now, the dura mater, which had already begun to puſh forth its granulations, ſhot out ſo powerfully from all that circle which was oppoſite to the firſt central opening, that I was twice obliged to ſhave it off.

"When my patient began to recover, he returned to Cazzalla, where I was ſoon called again to viſit him, on account of a large ſuppurating tumor of the occiput, covering the occipital bone; which being opened, I found this bone more thoroughly corrupted than any of the others. I carried him once more home with me, and carefully extracted theſe portions of bone, equal in extent to the former, but far more corrupted. Thus, after the former loſs of bone from the right-ſide of the cranium, almoſt the whole of the occipital bone, and a part even of the left parietal, were pulled away, yet the man recovered, the place of the caries being covered over with ſkin and cuticle, but thin, ſoft, and yielding."

When at any time I have ſeen large portions of the cranium thus carious, and ſeparating without injury to the brain, I have inferred that the ſcull was killed, merely from being deprived of its pericranium: when an old and drunken creature, for example, has fallen into the fire in a fit of intoxication, and the integuments have ſloughed, and the parietal bone exfoliated, of which I have ſeen repeated examples, the fact is plainly proved; but when, as in the following, the caries proceeds from a blow, we muſt remain in doubt whether ſuch blow had merely injured the integuments, or affected the bone.

"A woman about forty-five years of age, whoſe convivial talents I was not at firſt aware of, came under my particular care, with a large wound on the ſide of the head, about which ſhe told an incredible tale, ſaying ſhe had been robbed, though ſhe was pennyleſs, and that too in a place where no robbery ever had been committed. She ſaid, that after having been felled with a bludgeon, ſhe was left weltering in her blood; whereas, I am perſuaded, the blow ſhe had received ſhe deſerved too well to think of diſcloſing to us when or how ſhe got it. The

blow had been ſtruck obliquely, ſo as to lay bare a conſiderable portion of the ſcull; and in a few days I could perceive, upon putting my finger upon the ſcalp, that it was detached to a great extent. The integuments were thin and puffy, undermined with ſuppuration, and incapable of adhering to the bone, which, though naked, ſeemed to be ſound and freſh. The woman was hale and ſtout, had never an hour of ſickneſs, nor a reſtleſs night. She ſpoke, ate, ſat up, and at laſt was able to be half the day out of bed. Yet, from the ſtate of the bone, I believed her to be in the moſt imminent danger, for it became daily more and more diſcoloured, was yellow on all its expoſed ſurface, black on ſome points, and thoroughly rough and ſcabrous, and by the eighth or tenth day, I could plainly trace with the probe that deep rutt which defines the boundaries of a carious bone, and which formed ſo decided a line, and circumſcribed the caries ſo definitely, that in this, as in Sharp's caſe, it might have been miſtaken for a fracture.

"Aware of her doubtful condition, I requeſted the young gentlemen to watch her with particular care, and give me the earlieſt notice of any ſigns of danger; to report to me the ſlighteſt headach, or ſickneſs, or even a reſtleſs and perturbed night. At laſt ſhe was ſeized with ſymptoms of a very doubtful import, with languor, ſlight ſickneſs, a corded feeling in the forehead, and a violent cough; but ſtill I ventured to take this high reſponſibility upon myſelf, and defer calling a conſultation, leſt we ſhould be hurried into ſome precipitate ſtep. I now plainly ſaw, that matter began to ooze out by the edges of the carious circle, and was ſenſible that the carious bone muſt exfoliate; but while ſhe retained her health, was able to ſit up in bed, had no ſhiverings, nor the ſlighteſt fever, I felt conſcious that I was not entitled to perforate the ſcull, nor even propoſe the queſtion, and was ſure that I could not, without perforating, move the carious bone.

"While I waited in fear of worſe and fatal ſymptoms, yet in hopes of a ſpontaneous ſuppuration, ſhe was one afternoon ſeized with a paroxyſm of her habitual cough, ſo violent, that ſhe thought her head would rend aſunder; at laſt ſhe felt, from the violence of coughing, a ſudden ſenſe of burſting within her head: the feeling of ſomething having given way was ſo diſtinct, that ſhe believed (though ſhe could not imagine how ſuch an accident could happen) that her cap was torn, and ſhe took it off to examine it; when putting up her hand to the ſore, ſhe found it ſtreaming with blood, which continued to run down her cheek. That evening, her headach entirely ceaſed, ſhe had no more of the corded feeling; and, next morning, upon

preſſing with the probe at that ſide of the carious bone where the matter ſeemed to iſſue through a fiſſure, the whole to the extent of four inches, a piece the ſize of the palm moved eaſily with the ſlighteſt preſſure of the probe. From day to day it moved more eaſily; at laſt I diſengaged and extracted it without the ſlighteſt violence, and the little blood that flowed was rather from the tender granulations of the bone itſelf. The exfoliated part, conſiſting of both tables of the ſcull, was nearly four inches long; it had the irregular and indented appearance of a piece, a map paſted on board, and divided into ſhires and counties for the inſtruction of boys, and had not the ſlighteſt appearance of fracture *. As the integuments covering the carious bone were carefully preſerved, and the dura mater was in a ſtate of perfect granulation, thoſe ſurfaces adhered, and ſhe was ſpeedily and perfectly cured, and did not fail, when no longer dependent on me for medical aſſiſtance, to perſecute me with petitions for another ſort of aſſiſtance in her tipſy moods; often I ſaw her, after her cure, outrageouſly drunk, but never ſick; for theſe are a kind of people to whom, as the Scotch proverb ſays, "God is good."

Thus we have every reaſon to believe, that the mere ſeparation of the ſcalp will injure the ſcull; and the ſcull, injured thus by the death or ſeparation of its perioſteum, may corrupt ſo ſlowly, as to do no harm to the dura mater, nor endanger the brain, but terminate in harmleſs exfoliation. How elſe could we account for patients ſurviving the rude dreſſings of the older ſurgeons, the cauteriſing, and the ſcraping with exfoliating irons, till the cranium was thoroughly deſtroyed. This caſe affords a moſt important leſſon to the young ſurgeon; for, had the bone continued firm, the headachs increaſed, and the brain inflamed, I ſhould have been conſcious of having occaſioned the patient's death; and, ſince the ſeparation of the bone was a ſort of accident, and the conſequence of its not ſeparating would have been certainly fatal, I am almoſt inclined (however ſucceſsful) to condemn my own practice.

The great hoſpital, the Hotel-Dieu, affords us examples of the moſt barbarous and unſucceſsful practice, and (among the numbers whoſe conſtitution and natural ſtrength were contending with diſeaſe) we meet with with the moſt extraordinary cures, exfoliations, not of pieces of the cranium, but of the whole of it! the dura mater uniting ſoundly with whatever integuments remain, and the brain continuing in perfect health.

* This piece of bone is drawn in my general plate of the ſcull, lying on the board, near one of the ſculls, and is marked with the number of this page, 372.

"A poor unfortunate creature was dismissed, in October 1688, from the Hotel-Dieu, after two years illness, in consequence of a fall while in a state of intoxication. The upper part of the frontal, the whole of the parietal, and a great part of the occipital bone, having been exposed during the process of the cure *, exfoliated in their whole thickness, and were thrown off; so that this great exfoliation resembled the scull-cap sawn off in dissection. Many who were incredulous gave her money to show her head, which she kept always covered with a calibash, or gourd-shell. The pulsations of the brain were distinctly seen through the thin pellicle which covered it, and which was frequently studded with small vesicles, containing a reddish serum, terminating usually in little ulcers, which, together with her tippling practices, so protracted the cure, that at the end of three years the scalp was not entirely whole.

"The fact seemed so incredible, that often the audience, after Mr Davenry had shewn the bones, and related the case, came to me to be assured, whether I had indeed taken those bones from the head of a patient, and whether she survived †."

But that a wound of the integuments, naturally slight, and void of danger, may, by such misconduct, cause not merely caries of the bone, but suppuration of the brain, the following incident will prove to you. "A young man of seventeen years of age, was struck in play, by one of his companions, with a small stone on the left-side of the head, over the parietal bone. He put himself into the hands of a sort of surgeon, who dressed this slight wound with a heavy hand, cramming it so with rough lint, that the sore rankled and inflamed, with a daily wasting of the integuments. Yet the boy was well in all other respects, went daily to market, and served his master with his usual alacrity. I saw this slight cutaneous wound at the time of his first committing himself to the hands of the barber, with whom I at the time remonstrated concerning his coarse manner of dressing the wound; but he replied, "That it was the duty of a surgeon to be cruel, and not faint hearted." It was because the wound seemed so very slight, that I gave up attending the lad, but on the eighteenth day, he came to me of his own accord, desiring me to see how things went on. I found all the surrounding integuments fistulous, down to the bone, and there was one great abscess, full of putrid matter, which could not be emptied but by pressure of the hand. I, of course, advised that this abscess should be opened at its lower part, which the surgeon promised to do.

* "S' etant decouverts dans la suite du traitement."

† Saviard, p. 388.

"At this time I had no fixed quarters, but was obliged to follow the royal army, ſo that I was prevented from ſeeing the patient for ſome time; but, about the twenty-fifth day, I was called to him, and his friends mentioned to me, that the fever which I found him in had continued four days. His eyes were heavy and ſwelled; he was in a ſort of ſtupor, and was reduced to extreme weakneſs. The ſinus was ſtill unopened, and contained very fætid pus; for this blockhead of a barber had, either through pride or fear, altogether neglected what I adviſed.

"I had now no reaſon to doubt that the brain was affected, and propoſed that the integuments ſhould be laid open, and the bone perforated, thinking a doubtful remedy preferable to certain death. But, the preſumptuous fool, when he heard that I had propoſed to perforate the ſcull, proteſted, "That if it were not for the fever, or if the fever ſhould ceaſe, he could make the cure of the wound a very eaſy matter."

"On the twenty-ſixth day, this young man expired; I requeſted that his body might be opened, and the empyric conſented with all poſſible alacrity, aſſured in imagination that his patient's death proceeded merely from fever, not from any injury of the head; and in this preſumption he was hardened by recollecting, that from the firſt there was no ſign nor appearance of any injury to the bone.

"Upon opening the head, the cranium was, indeed, found free from fracture; but there was found betwixt the ſcull and dura mater a conſiderable quantity of matter, the brain being at that place ſuppurated, and melted into pus*."

Thus are we aſſured, that the mere detachment of the ſcalp (if it continue detached) will deſtroy the ſcull, and endanger the brain; for, though it has (in the dura mater, and in its own ſtructure) various ſources of nouriſhment, though it is little injured by a temporary or partial privation of blood, yet the permanent ſeparation of the pericranium manifeſtly kills the ſcull through its whole thickneſs. In the older times, when the doctrine of exfoliation prevailed,—when they were in the practice of cutting off the ſcalp, ſo as to occaſion the death of the ſcull,—when the ſeparation of the dead part was miſtaken for an eſſential proceſs in the cure, it was reckoned the indiſputed duty of the ſurgeon to procure exfoliation in every wound of the ſcalp; and he attained his end, both by holding off the ſcalp from the ſcull, and ſo preventing its re-union, and by ſcraping and cauteriſing the bone.

In modern ſurgery, nothing is to be ſeen at all correſponding with this;—the ſcalp is never, by any accident, kept ſeparate from the ſcull, unleſs it be by an ef-

* Botallus, p. 736.

fufion of blood under the pericranium. There are no circumftances in which the fcalp is more effectually feparated from the fcull, than in fuch extravafations, and none more dangerous to the bone; for, however violent the feparation of the fcalp in cafes of laceration, there is in a few days a healthy flap of fkin, and a grannulating bone ready to unite together, aided by all appliances and means to boot, on the part of the furgeon. But, in the cafe of bloody effufion, there is, in place of the contact of furfaces, always a fluid, always a foreign body interpofed, thence the fcull is as naked as if expofed to the outward air. The furgeon, unwilling to open a tumor which he has often feen difappear fpontaneoufly, lingers, and is irrefolute, and when he at laft is forced to open it, is confcious, as foon as the blood is evacuated, that the bone is carious, and in part abforbed, and that he fees diftinctly the pulfations of the brain.

Children are often born with tumors, produced by the preffure of the bones of the pelvis upon the prominent centre of the parietal bone, or by the preffure, in the courfe of the dilatation, of the orifice of the womb, efpecially in a firft labour, and in a woman advanced in years. Yet thefe effufions of blood do not always corrupt the bone, but ufually difappear in a few days.

Very frequently carelefs nurfes, or idle mothers, leave their little children afleep on a high bed, and when they awake, and begin to tofs and cry, they, if not immediately attended to, fall out of bed, head foremoft. I have very frequently been called to children who have fallen thus from the carelefnefs of nurfes, and often the fall has been fo violent, that the mother, juft before fhe heard the child's fcreams, has diftinctly heard its fall from an adjoining room. I have feen the effufion fo great, as to raife a tumor which you could hardly cover with the palm of the hand, and apparently containing three ounces of extravafated blood; the child meanwhile lying in a ftate of ftupor. Yet, the ftupor is merely from the child having fatigued itfelf with crying, and fuch tumors ufually difappear. Many as I have feen, I do not remember one which required to be opened, and remember one only which ulcerated the fcalp, and burft, after deftroying the bone. That child, which I attended, along with Mr Lawfon, furgeon, loft a piece of the parietal bone of confiderable extent, but did not fuffer in its health.

More formidable effufions of blood happen in rambling fchool-boys; and they are of fuch a defcription, as might tempt the inexperienced furgeon to open them. Whether from opening fuch tumors any ill confequences might refult, I fhall not venture to predict, and do not by experience know. But of this I am affured, that if left

alone they are generally ſafe; that if the young ſurgeon were to yield to the ſuggeſtions of his own fear, whenever in thoſe caſes he imagined he felt a depreſſion, and were upon this preſumption to cut open the integuments, and trepan the ſcull, the iſſue of his adventure would be very often fatal, and many a boy would be, as ſome have been, "killed by art, for want of art." The deception proceeds from this peculiarity, that where the veſſels ruptured by the fall have made the greateſt effuſion, the blood continues long fluid; and if there be one large artery burſt, and the tumor has a degree of pulſation, it continues always fluid; but, towards the margin of this cavity, where the cellular ſubſtance is not entirely detached from the pericranium, the blood is ſo injected into the cellular ſubſtance, and mixed with its fibres, that the baſis and margin of the tumor are uncommonly firm, and the hardneſs ſuch as actually to reſemble that of bone. From this hard circumference, the ſurface apparently declines towards that part where the cranium is more diſtinctly felt through the fluid blood; and the declivity is ſo diſtinct, and the hardneſs of the margin ſo entirely reſembles that of the centre, where the ſcull is felt unequivocally, that the ſurgeon has not the ſlighteſt doubt that he feels a wide and deep depreſſion of the ſcull; and when along with this the boy lies oppreſſed, and vomiting, he can hardly refrain from opening the tumor, or think himſelf vindicated in leaving the boy without help.

I know no deception which experience ſo effectually corrects as this, of an apparent depreſſion felt through a bloody tumor of the ſcalp; nor can any thing but experience correct it; for to the ſenſe of touch, the depreſſion is ſo palpable, and the boy's danger ſo very obvious, that even an experienced ſurgeon, on any new occaſion of examining ſuch a tumor, is confuſed with the very peculiar feeling of that deception, which he is already aware of. Many times I have been called to rambling boys, who had fallen in climbing walls, or in playing about ſaw-pits, and unfiniſhed buildings; and have often found them with great effuſions of blood over the parietal bone, and apparent depreſſion; the face ghaſtly, and the extremities cold, in a ſtate of inſenſibility, with the eyes not cloſed, but turned upwards, as in the convulſions of children. But, fortunately for me, the caſe of the boy that I firſt ſaw lying in this ſtupor, in the earlieſt part of my practice, was ſo perfectly deciſive, that I have never ſince been in danger of any precipitate ſtep; for this boy, who had fallen from a garden-wall, lay in a ſtate of abſolute ſtupor, and with a degree of convulſion during four days. He vomited inceſſantly, and his extremities were cold, and his face ghaſtly. The appearance of

depreſſion was ſo ſtriking and ſingular, that I made not the ſlighteſt doubt, that if he did recover without any operation, manifeſt marks of depreſſion muſt remain. But he recovered in a few days perfect health and ſpirits, and the appearance of depreſſion vaniſhed, as the blood was abſorbed. In ſhort, theſe effuſions are very general, even when of the largeſt ſize, mere bloody bumps, which, like Squire Richard's, require only vinegar and blue paper.

Three years ago, I viſited, with Mr Cheine, ſurgeon in Leith, a boy whoſe ſituation ſeemed abſolutely deſperate. He had fallen headlong from a corn-loft upon the rudeſt pavement I have ever ſeen, conſiſting of big, poliſhed, and prominent ſtones. The depreſſion ſeemed too obvious to be diſputed. The boy vomited inceſſantly, and lay in a ſtate of ſtupor, unleſs when he cried out in his delirium, for he continued delirious for many days. He often threw himſelf backwards in his mother's arms, reclined his head, and ſtiffened as in a convulſion. Yet this boy was ſpared the cruel and dangerous operation of trepan; recovered with very little aſſiſtance on our part, farther than was merely neceſſary to amuſe the parents; and is now in perfect health.

Thus we are conſcious, that all effuſions of blood are not under the pericranium; that the blood is often effuſed among the layers of the pericranium, muſcular aponeuroſis, and ſkin, in ſhort, of the common cellular ſubſtance, and is abſorbed, without danger to the bone. But when the blood is effuſed under the pericranium, ſeparating from the bone thoſe membranes, and that cellular ſubſtance which ſhould nouriſh it from without, the bone muſt die; not by that peculiar power which has been long aſcribed to blood, of diſſolving bone, but by acting as a foreign body, and ſeparating one natural ſurface from another.

I know not whether any ſpecific and unalterable rule can be propoſed for the treatment of caſes ſo various in their forms, their cauſes, and probable effects, but ſomething I feel inclined to ſay on this ſubject. *Firſt*, Effuſion of blood among the layers of the ſcalp, and pericranium, of whatever form, and with whatever ſymptoms attended, is not to be raſhly touched. The blow, and general ſhock which occaſions this ſuggilation without, is, I am perſuaded, accompanied with a degree of effuſion within. A boy may lie ſtupid from ſuch a ſhock, without danger, and time muſt be allowed for the operation of the natural powers, and the abſorption of the internal effuſion, as well as the diſſipation of the external tumor. But

let it be a rule with you, never even to think of incifions, nor permit them to be mentioned in your prefence, while the effufion has the character of mere fuggilation, or euchymofis; *i. e.* while the blood is diffufed among the cellular fubftance, with little fenfe of fluctuation, and that little leffening every day *. Such are the effufions in the fcalps of new-born babes, and children who have had flighter falls from the bed, or cradle. *Secondly*, When the tumor affumes the proper form of aneurifm,—when there is a large and circumfcribed tumor, fluid blood in the centre,—a hard bafis, and margin,—a diftinct pulfation through the whole tumor, and its fize increafing from day to day, there is great danger to the fcull: the tumor fhould be laid open without delay, and dreffed with lint; and it will, after two or three days of fuppuration, (in which the matter will be fœtid, from being tainted with the blood), heal kindly; for the arteries of the fcalp, when thus bruifed, and pouring out blood, have fufficient force to maintain, or even to enlarge, the effufion of blood which cannot be abforbed, in oppofition to fuch a caufe. Yet, when opened, fuch arteries do not bleed much, the hemorrhagy is fuppreffed merely by applying a bit of lint; they rarely need to be tied. *Thirdly*, Effufions of blood, though unaccompanied with pulfation, if they continue fluid, and do not gradually fubfide from the period of the fixth or feventh day, muft not be regarded as of a flight or indifferent nature, and, before the tenth or twelfth day, fhould be opened †. From all the experience I have had, thefe rules of conduct will be ufeful to you; and while I warn you to refrain in general from opening fuch tumors, it is alfo my duty to ftate unequivocally and plainly, that there are others which occafion caries of the fcull, where a little imprudence, a little delay, endangers the patient's life.

" Mr Harrold, partner to Mr Wilmer, had a boy brought to him, of fourteen years of age, with a tumor on the crown of the head, the fize of a hen's egg: It was feated on the middle of the fagittal future: It was occafioned, as his father related, by a blow, the boy having been ftruck over the head with the arm of a broken

* Mr Petit fays, p. 88. " Rien n'eft fi commune que le Boffe a l'occafion d'un coup a la tete elle n'eft fouvent qu'un bagatelle."

† Scultetus fays, " Mirabili fucceffu curatur contufio capitis mactatorum animalium pellibus, præfertim vero muris et canis, quæ contufiones dum adhuc calent adhibitæ, et per viginti vel plures horas relictæ egregiæ diffolvunt."—P. 109. The dog-fkins, and the moufe-fkins, are as harmlefs, but not a bit more efficacious, than Squire Richard's blue paper. It means no more than letting fuch tumors alone, till the blood be abforbed.

chair: The ſwelling enſued immediately after the blow. The father had flattered himſelf with hopes of its diſſolving by time, and the ſimple remedies recommended by his neighbours; but about two months after the blow, he brought the boy to Mr Harrold, the tumor undiminiſhed, and containing, according to Mr Harrold's apprehenſion, nothing but blood. As a meaſure of precaution only, and without apprehending the diſorder which had already been produced, he opened the tumor with a long inciſion, and diſcharged a quantity of blood, yet fluid, and not in the ſlighteſt degree grumous nor blackened; and, as the artery from which it had flowed was ſtill open, and a conſiderable hemorrhagy enſued, he dreſſed the cavity haſtily with dry lint.

"On the ſecond day, he removed the external dreſſing; but, not chuſing to riſk a ſecond hemorrhagy, he left the lint which adhered more immediately (and very ſtrongly) to the ſurfaces, untouched: When this alſo was removed at next dreſſing, much ichorous and putrid matter was diſcharged, and, upon looking into the bottom of the cavity, was ſurpriſed to perceive diſtinctly the pulſations of the brain, and that the bone was entirely wanting in all that part which correſponded with the baſis of the tumor, a ſpace of two inches in diameter." The danger of this boy, then, was moſt conſpicuous and imminent; fortunately the dura mater granulated, and the opening healed kindly.

Such are the dangers proceeding from delay, thoſe ariſing from miſconduct are not leſs to be feared.

"A ſchool-boy, having his hair ſeverely pulled in a quarrel, there roſe a ſmall bloody tumor of the ſcalp, which he concealed for three weeks, till it had extended from the ſize of a pea to that of a large tumor ſeven inches long, and four inches broad, riſing very high in its centre, and covering much of the parietal and frontal bone. This was an aneuriſm too large to be void of danger, and required deciſion in the opening of it, and delicate dreſſing to prevent ill conſequences, and bring it to a right ſuppuration. Mr Hill of Dumfries was deſirous of having it opened with cauſtic. The gentleman who had him under his care preferred the lancet. Upon puncturing the tumor, four inches of pure and florid blood flowed from it, and the pericranium appeared entire. Mr Hill now propoſed a looſe bandage, till the parts ſhould have time to contract; but again, ſays he, "I was overruled, and a thick compreſs was bound down over the tumor, and a doſſile put into the orifice." Next day, the integuments had adhered cloſely to the pericranium,

and a full ſac was formed at each end; and, to diſcharge theſe, the gentleman tore up the ſcalp, by thruſting a probe under it, and then renewed the compreſs. On the third day, the ſacs were again filled, the parts adhering ſo firmly, that the probe could not be introduced, though he tried it ſeveral ways, and with ſo much force, that the bone was laid bare in three places.

"Then followed an œdema over all the ſcalp. The gentleman to whoſe care the caſe was committed being out of town, the ſore was neglected for three days; the ſwellings increaſed; there was much pain, fever, ſickneſs, and a degree of delirium and raving. On the fourth, two cauſtics, notwithſtanding the inflamed ſtate of the ſcalp, were applied; and on the fifth, the bloody and purulent matter being diſcharged, and a fomentation applied all over the head, the delirium ſubſided, and the ſwelling ſoon vaniſhed. There were now three openings, each of which continued to run for many weeks, till the bones which had been laid bare exfoliated."

Mr Hill's philoſophical account of the delirium and fever, and his unphiloſophical aſperity in criticiſing the practice of his confrere, I paſs over in ſilence; obſerving only, that there was leſs blame in preferring the lancet to the cauſtic, than in making an opening inadequate to any purpoſe but that merely of diſcharging the blood. In every aneuriſmal ſac, the ſurfaces are inſulated from each other, are dead and ſloughing; they cannot adhere; the applying of compreſſes, in place of uniting the parts, only extends the miſchief; ſuch tumors ſhould be laid fairly open. There is no uniting (without an intermediate ſuppuration) the walls of an aneuriſmal ſac, eſpecially if the floor of that ſac be a carious bone.

Before I forſake this ſubject of injuries external to the cranium, I ſhall repreſent to you one which is attended with no danger of caries, but relates to the ſcalp only, a nervous and moſt ſingular diſeaſe; reſembling that which ariſes from ſome injury in bleeding in the arm, attended with little danger, but marked by convulſive motions, nervous affections of the moſt undefineable nature, and ſometimes with agonizing and periodical pain; pain varying according to the ſtate of the weather, or the patient's health.

"The man whoſe caſe I am going to relate to you, was about thirty-two years of age, ſallow, ſickly, and, I fear, diſſolute. He had loſt his health, his induſtry, and his morals, by an unfortunate blow on the head, which had deprived him of reaſon for many months; and, after a ſecond blow on the head, he ſuffered, in conſequence of the ſewing of the temporal artery, a very ſingular nervous affection.

" Firſt, about three years ago, he was attacked by ſome drunken companions of his own, who, knowing he had in his pocket thirty ſhillings of wages, and he refuſing to treat them, way-laid him in a dark paſſage, and knocked him down in revenge. He fell backwards into a cellar-ſtair, ſtruck the back of his head againſt the ſtones, and was carried to the hoſpital ſenſeleſs; where, notwithſtanding every care of the ſurgeons, he loſt his reaſon, continued many months inſane, left it at laſt in a weakly and languid ſtate, ill able to return to his hard labour, that of preſs-man in a printing-office. From that time he wrought little, and irregularly, became a miſerable vagabond, ſubſiſting chiefly on charity, and living among his friends.

" About three months ago, as he was coming down an open ſtair, which had no hand-rail, and was ſo dangerous as to have been the occaſion of frequent complaints to the landlord, he fell over the ſtair, and lighted among ſharp ſtones, and his forehead was laid open with a ragged wound, about four inches in length, extending from the forehead to the temple.

" The ſtair was notoriouſly dangerous, and the night dark, but he confeſſes that he was a little tipſy. Nothing ſo ſurely indicates a vagabond and idle life, as indifference to cleanlineſs and health; he did not return to his old aſylum, the hoſpital, but, with a penny-worth of Wade's balſam, and ſome filthy apparatus of rags, made a faſhion of dreſſing his wound, till, by filth and neglect, it ulcerated; the temporal artery was eroded; the blood ſprung briſkly from the corner of his ſore, and thus he was brought to the Infirmary.

" The houſe-ſurgeon ſewed the artery; he was laid in bed, and enjoined not to ſtir, leſt it ſhould burſt out again. He was very timid by nature, and the ſtudents took a pleaſure in alarming him from time to time, with ſaying, that it would ſurely burſt out again. About a fortnight after, the ulceration ſtill extending, the artery was again eroded; and at night, betwixt ten and eleven o'clock, when turning gently in bed, he felt his forehead moiſt; and, upon putting up his hand, found it wet with blood. The artery ſoon began to bleed *per ſaltum;* and the houſe-ſurgeon being called, the artery was again ſecured, by ſtriking a needle and ligature under it.

" After the firſt ſewing of the artery, he felt nothing unuſual; but after this ſecond ſtroke of the needle, he found, next morning, his mouth purſed up and contracted, his jaws ſo clenched that he could not ſpeak, while ſpaſmodic contractions extended along the neck and throat. His cheeks were flattened, and his mouth purſed up, and at the ſame time protruded as in a ludicrous ſimpre, or like one at-

tempting to whiſtle, and prevented by an inclination to laugh. The form of the face was remarkably changed; the ſphincter oris purſed up the mouth, while the zygomatic and triangular muſcles retracted the corners of it, and made the dimple natural to that part very deep; the cheeks were flattened, the mouth protruded; when he attempted to ſpeak, which he did imperfectly, the whole face was agitated, and his tongue got entangled between the upper and lower ranges of teeth, ſo that he imagined, if he perſiſted, he might bite it acroſs; and the throat and the whole neck was obviouſly contracted in a ſpaſmodic ſtate, accompanied with remarkable pain; and he could not open his jaws to receive the ſmalleſt particle of food, but lived on ſpoon-meat."

This fellow's face was drawn into ſuch a ludicrous ſimpre, that he was ſuſpected of being an impoſtor. If ſo, he was an ingenious one,—ſince it required ſome knowledge of our profeſſion to invent ſpaſms, ſo naturally accompanying a puncture of the ſcalp,—and a facetious and a merry one, for I never ſaw a phyſiognomy, nor contortions of face, ſo very ludicrous: The perſevering compoſure and gravity with which he ſat up in bed, the principal actor to a much amuſed aſſembly of ſpectators, was not art; he might indeed clench his jaws voluntarily, or purſe up his mouth, but I know no power by which he could contract the muſcles of his neck and throat, and keep them in a rigid ſtate aſleep or awake. Nor is the luxury of being fed with bread and water from a ſpoon any great temptation to linger in an hoſpital. We very often, from ſlight wounds of the ſcalp, ſee ſpaſms and contractions of the face and neck in thoſe who lie under no ſuſpicion, and pains continuing for months after ſuch wounds are healed; we find that a ſmart inciſion cures them, which would be a ſevere retaliation for any intended fraud, and a good preventative againſt any ſuch practical jokes. I have ſeveral times been a party in conſultations, where epilepſy had, in boys under eighteen years of age, followed ſometimes ſevere, and ſometimes ſlighter wounds of the head; and in which the epilepſy was connected with particular feelings in the ſcalp, as it often is preceded by an aura, or undefined coldneſs and convulſion running along a particular limb; and, though an inciſion does not always give relief, the keeping an iſſue in the wound, and thus exhauſting the irritability of the part, uſually does.

Any wound, ſurgical or accidental, in any part of the body where nerves are injured, eſpecially where they are expoſed, will produce the ſame diſorders. In Hydrophobia, the convulſion is plainly connected with a painful ſtate of the wound; in locked jaw, the convulſion uſually comes on when the wound heals; after an

amputation rudely performed, or ill cured, where the extremities of the brachial nerves are engaged in the cicatrice, moſt violent convulſions often ſeize the mutilated member; it ſtarts night and day with ſuch violence, as to allow the patient no ſleep nor reſt; and this pain and convulſion returns in paroxyſms, and continues for years. Firſt the ſtump inflames, then comes on a violent acceſſion of fever. Then the ſtarting begins chiefly when warm in bed. I have ſeen the point of an amputated humerus ſwell to the ſize of a buttock, accompanied with ſuch painful convulſions, that I was afraid of them bringing on ſome epileptic diſeaſe; and, without exfoliation, or ulcer, or any obvious change, the pain and convulſion ſubſides again. I have remarked, that after extirpation of the cancerous mamma, or of ſchirrous glands, the returning diſeaſe is preceded by ſuch nervous affections, extreme ſenſibility, and periodical pains in the wound;—a ſure prognoſtic that it will burſt out again in horrible ulceration, and that the patient will die.

"A young lady of fifteen years of age, playing with a younger ſiſter, and ſtruggling for an apple, ran her elbow upon the point of a knife which her ſiſter held in her hand; and with ſuch violence, that it ſtuck upright in the wound, the point being fixed in the bone. The young ladies were both ſo alarmed, that they had not power to draw it from the wound, and a man, who was paſſing, pulled it out rudely, and threw it careleſsly away; it never could be found, nor was it poſſible to tell whether the point of the knife had broken, and remained buried in the bone.

"The wound was on the outſide of the fore-arm, a mere puncture, about three inches below the joint; ſeemingly the knife had ſtuck faſt in the ulna. There was no bleeding, but ſuch as ſtopped ſpontaneouſly. She continued to walk for an hour, in cold weather, without being ſenſible of much pain; but ſoon the fore-arm and hand began to ſwell, the pain increaſed ſlowly; ſhe walked home in great diſtreſs, and it was three days before the leeches and poultices, which were applied, brought any relief; the pain at laſt ceaſed, the ſwelling ſubſided, the wound healed; but a very few days only had elapſed, when the ſwelling returned, the pain was excruciating, and extended along the ulna to the hand, while the little and ring fingers were contracted and ſomewhat benumbed; but the continued application of poultices and leeches, once more removed the ſwelling, and allayed the pain.

"This young lady has, for three years, ſuffered the moſt unaccountable and ſevere diſtreſs. She is not eighteen years of age, of a florid complexion, in perfect health, and in good ſpirits when not ſubdued by intenſe pain, free from every

thing like nervous diſeaſe. But, the pain which ſhe felt an hour after receiving the wound, and which returned with great violence, juſt as the wound healed, has returned periodically ever ſince; ſometimes after an interval of eight days, ſometimes for the ſpace of a fortnight, ſhe is well; but very rarely does ſhe enjoy an intermiſſion of a month without pain. Accident, or the ſlighteſt exertion, occaſions her pain to return, and at each return it ſeems more acute. If deceived by an interval of eaſe, ſhe thinks herſelf well, and walks, or rides, or dances: although ſhe carries the arm in a ſling, or holds the bridle in her left hand, a paroxyſm of pain comes on, which riſes ſometimes to the moſt extreme torture. The arm ſwells from the hand to the ſhoulder, and is tenſe, firm, and red, but without any peculiar appearance in the wounded part, or any chance of ſuppuration to bring relief. The pain extends from the finger-ends to the ſhoulder, and along the neck. She ſuffers the greateſt torture, when warm in bed. The pain precedes the ſwelling for ſome hours, but when the ſwelling comes, it brings no relief; it continues often increaſing for eight days; and when it ſubſides, there is left a remarkable degree of ſenſibility, about the place of the wound; ſhe ſhrinks when it is touched, or when even with the gentleſt preſſure of the finger I trace the ulna downwards from this point. Laudanum, leeches, fomentations, and all the uſual means which were at firſt ſucceſsful, now fail to give relief; while the paroxyſm continues, ſhe is confined to her couch, and dare not move; when it ſubſides, ſhe carries the arm in a ſling, for to let it hang excites, or continues the pain. When ſhe begins (after a paroxyſm of pain) to walk abroad again, a walk longer than uſual is ſure to produce a paroxyſm; and when it is brought on by any exertions ſo violent as dancing, or riding, it is peculiarly ſevere, and continues long. It is now three years ſince ſhe has ſuffered almoſt inceſſant miſery, with ſhort and uncertain intervals of eaſe. There was indeed a period of this time, (but of very ſhort duration), in which ſhe lived for months almoſt free from pain; but the pain is become of late extremely acute, and is accompanied with inſenſibility all round the wound, and numbneſs of the hand; the laſt paroxyſm, (which has juſt ſubſided), was ſo unuſually violent, that, though ill able to endure the motion of a carriage, ſhe has undertaken a journey of two days, and arrived in town ſtill in great diſtreſs, and willing to reſign herſelf to any meaſures, however ſevere, which may promiſe relief."

Such was the brief hiſtory of this young lady's ſituation, when ſhe was put under my care, by Mr Robiſon, ſurgeon, upon whoſe memorial on her caſe I addreſſed an

opinion to her friends, acknowledging ingenuouſly the difficulty of pronouncing whether thoſe ſymptoms might ariſe from the puncture of ſome nerve, or from a wound of the bone; reminding them, at the ſame time, of that drawing of Cheſſelden's, in his Aſteology, where, after the death of a patient, who had an anchyloſis of the knee-joint, there was found ſticking deep in the ſpongy head of the tibia, the broken point of a knife; and while I adviſed that an inciſion ſhould be made through the ſcar of the original wound, I alſo acknowledged that this was one of thoſe ſingular and diſtreſſing caſes, when our moſt deliberate opinions could be no better than a conjecture, and our operation an experiment, but one which was happily void of danger.

It was my earneſt requeſt, that this ſhould be a matter of reflection for her friends, who, in a caſe where the opinion of profeſſional men was ſo far from deciſive, a thouſand other circumſtances came to be conſidered. She returned home; but, after ſuffering the ſame ſucceſſion of intenſe pain, and imperfect relief, ſhe came to town to ſuffer the inciſion to be performed. I now called the advice of Dr Monro, who approved of the opinion I had given, and was witneſs to the inciſion I made, which was carried firmly and ſteadily down to the bone, and was nearly three inches long;—no remains of the knife—no apparent diſeaſe of the bone,—no peculiar feelings when the ſcar was cut acroſs, could be remarked. She bore the inciſion, and ſtill more painful ſearching of the wound, with perfect compoſure and reſignation. I am ſorry to acknowledge, that ſhe paſſed the enſuing days in extreme torture, and, though the wound healed in the moſt kindly manner, had no relief.

Upon her arrival at home, nervous and anodyne medicines, mercurial frictions, electricity, and every likely means of relief, were adminiſtered, under Mr Robiſon's care. Theſe were all ineffectual, till the diſeaſe, as if it had exhauſted itſelf, ſpontaneouſly ceaſed. Her recovery was as unaccountable as the cauſe of her diſtreſs. The paroxyſms became gradually leſs formidable, and in the fifth year of her diſtreſs, ſhe ſlowly recovered, and now enjoys uninterrupted and perfect health; relieved, perhaps, by the re-uniting of ſome reconciled or punctured nerve; a proceſs which you know, by much experience, nature does accompliſh, though very ſlowly.

Other ſingular caſes of anomalous nervous diſorders, ariſing from wounds, I ſhall reſerve for a fitter occaſion; obſerving only, that ſpaſms and pains, occaſional ſwellings of the head, and clenching of the jaws, ariſing from punctured wounds

of the head, need no more ſurpriſe us, than ſuch ſwellings of the arm, contractions of the finger, and capricious nervous afflictions, ariſing from punctures of the lancet, or even of a needle, or ſuch trivial wounds as that which I have deſcribed. I find ſlight notices of this diſorder ariſing from wounds of the ſcalp, or circumſtances which ſuggeſt to me that it is frequent, (though not remarked), in almoſt every book I read.

In Wepfer, I find an intereſting caſe of one Conrad Mejer, a lad of nineteen years of age, apprentice to a blackſmith, who was ſtruck by his comrade with his pinchers, with ſuch hearty good will that the part of the handle of the pinchers, about as thick as the little finger, ſtuck in the ſcull, near the angle of the os frontis. Yet he did not fall, but pulled out the piece of the pinchers with his own hands. He loſt no more than ſeven or eight ounces of blood, and the wound was dreſſed by his maſter with ſome ſtyptic powder. I ſhall not detain you with the further narrative concerning the treatment of the wound, how ſmall it was, ſcarcely admitting the point of a quill, or how little dangerous, till it was crammed with tents and digeſtive ointments, and cloſed up with plaſters;—how more profuſe the bloody matter ſeemed, when compared with the depth of the wound;—how the wound became fiſtulous, and admitted the probe to paſs under the temporal muſcle;—nor the various changes in the appearance of the wound, in the ſickneſs, or other ſymptoms: —Suffice it to ſay, that by its own nature, and by bad ſurgery, the ſinus continued long open; that while its orifice contracted the matter accumulated, the ſcalp and eye-lids ſwelled, and the glands of the neck inflamed;—that a cauſtic was applied, and the ſinus changed into an open ſore;—that then the cranium was found bare, and the probe ſeemed to penetrate through the temporal bone.

Three or four months paſſed in the cure of theſe fiſtulous ſores. "Wepfer ſaw the patient again in the ninth month, when the wound was entirely healed, and there remained only a ſwelled gland behind the ear, which diſappeared when the pain ceaſed. At the year's end, he was perfectly well, and as free from glandular ſwellings, as from pain; the wound ſeemed ſoundly cloſed, and had remained ſo for many months. Then it opened. He dreſſed it with a turpentine dreſſing, (lachrymam abietis indedit; he dropped into it a drop of the exudation from the fir-tree); it remained open only fourteen days, and when it healed the pain again ſubſided.

"At the diſtance of four months from this time, the patient felt for two days a ſenſe of creeping, running up the arm, from the elbow to the ſhoulder, night and day; and, on the third night, while in bed, he felt a chilneſs like ice, or ſnow, run along

the arm and fore-arm; and, after having three times had this particular feeling, he was ſeized with a convulſion of the mouth and left-cheek. During the following night, he was again aſſailed with the ſame diſorder, which laſted while he could repeat a prayer, and returned four times; and from this time it returned often, during both day and night, with intervals ſometimes of ſeveral hours. While the convulſion laſted, the ſaliva flowed from his mouth, and he had occaſion to obſerve, that this was increaſed by cold. In ten days more, the convulſion was ſo far increaſed in ſtrength and frequency, that he was often interrupted in eating, and day nor night had no reſt. The head was turned to one ſide, and the maſtoid muſcle was ſeen trembling with a ſort of convulſive motion. After this, he procured ſome kind of oil from a quack, and with a feather he anointed the afflicted arm, and the neck, and took of it inwardly. After this, the arm felt as if mice had been crawling along it. The head was agitated with a convulſive motion, backwards and forwards: The convulſion of the mouth leſſened, while the ſhock of the general convulſion was ſo great, as to precipitate him from his ſtool under the grate. In this deſperate condition did he ſtruggle from early in the morning till mid-day. He preſerved his ſenſes all along, but, after the violence of the convulſion was over, fell into a ſort of oppreſſion and languor. He fortunately diſcovered, that he could by hard labour prevent the convulſion. From this time he had no more fits. But ſtill the feeling of cold, and creeping, continues, and he prevents it terminating in any violent attack, by working at the anvil. I preſcribed Valerian powder, (ſays Wepfer), and found him ſtill well at the end of the ninth month *."

* " Ipſum St Blaſſii Die 18. Sept. 1673, rurſus vidi, vulnus plane conſolidatum fuit. Ante tres circiter menſes caput valde ſubinde doluit, quandoque adhuc vomuit. Glandula inſtar ſcrophulæ poſt aurem dolore vigente intumuit; eo ceſſante detumuit. Adhuc ſcrophula fabæ magnitudine ibi tangitur, ſub cuti mobilis. Nunc ne minimum dolorem patitur: nullus tumor tangitur. Appetit, mandere poteſt. Optime nunc habet. Conrad Mejer nunc 21. annum agens me convenit St Blaſſii 1674. d. 24. Martii vulnus ſupra tempus dextrum coaluit æſtate, coalitum manſit tribus menſib. ſemper indoleus. Autumno 1673, declinante Menſe Octobris, recruduit, lachrymam abietis indidit: apertum manſit 14. diebus: poſtea iterum conſolidatum fuit: nullum amplius dolorem paſſus eſt. Die 3. Febr. 1674, in brachio ſiniſtro ab olecrano ad humerum ſenſit formicationis ſenſum diu noctuque per biduum die 5. Febr. noctu ter ab humero ad cubitum ſenſit frigus ceu gelu ad cubitum; mox ſupervenit convulſio oris et malæ ſiniſtri lateris. Die 6. Febr. idem quater noctu evenit, duravit per tribus vel quatuor, Pat. Noſt. Poſtea noctu diuque crebro invaluit ſæpeque per aliquot horas inducias conceſſit. Præſente motu convulſivo multum ſalivabat. Obſervavit a frigore ſymptoma hoc auctum fuiſſe. Die 16. Febr. tam crebro invaſit, ut diu noctuque nullam quietem conceſſerit, ſæpeque inter edendum impediverit, caput quoque ad

On various occaſions, I have ſuſpected that diſeaſe to be in the ſcalp, which was attributed to the ſcull, for I know not how ſymptoms of a nervous complexion, amounting even to epilepſy, could ariſe from the ſcull, or be cured by exfoliating a rough or blackened piece of bone. "A girl, of fifteen years of age, (ſays Mr Gervais), fell, in going down ſtairs, ſtruck her occiput, and lay without ſenſe or motion, bleeding from the noſe. The headach continued ſeveral years, for which ſhe was repeatedly bled, though much relieved by theſe bleedings. There remained a fixed pain in the back of the head; during fifteen days it was ſupportable, but then increaſed, and returned in regular paroxyſms. When ſhe rubbed the occiput ſtrongly with the hand, ſhe fell into a faint, and, from the time that the pain of the head had increaſed, ſhe had ſuffered daily eight or ten attacks of epilepſy.

"Mr Gervais, in examining the pained part, remarked a ſmall blackened ſpot on the upper and middle part of the occiput, and then the ſkin appeared ſoft and tender; and Mr Gervais preſſing by chance with his finger upon that ſpot, ſomewhat rudely, the girl fainted. He could not conceive that ſuch ſlight preſſure could be the cauſe of her fainting. When ſhe recovered, he again began to finger the part, and upon preſſing with the finger, ſhe again fainted. It was then only that he ſuſpected he was himſelf the cauſe of this ſyncope; and, upon preſſing with the finger a third and a fourth time, ſhe fainted every time he drew it acroſs the livid ſpot. Having failed to relieve this girl by the ordinary remedies, it was reſolved, in conſultation, to make an inciſion. They found the pericranium detached, and the bone affected; and the ſymptoms ſtill continuing, Mr Gervais was in doubt whether to trepan, or to expect relief from exfoliation; and, fortunately, the bone no ſooner exfoliated, than the girl was entirely relieved *." The periodical return of this pain,—the periodical pain

ſiniſtrum latus traxit: in muſculo maſtoideo videbatur motus aliquis tremulus, ſeu ſubſultorius. Poſtea inungebatur oleo quodam ab empirico conceſſo penna per totum brachium ſiniſtrum, collum, &c. etiam intus præbuit: Per brachium videbantur mures decurrere ab inunctione, item caput antrorſum et retrorſum ſuccutiebatur: Convulſio oris remiſit: Convulſiones à ſcamno ſubtus fornacem ipſum præcipitarunt. Duravit hæc ſuccuſſio à ſummo mane ad meridiem: ſemper mente conſtitit: poſt hanc ſuccuſſionem laſſitudo ſpontanea ſupervenit. Obſervavit à labore ſe paroxyſmum declinare potuiſſe: poſt hanc ſuccuſſionem nullum amplius paroxyſmum ſenſit: ſemper tamen adhuc ſenſus frigoris et leviculæ formicationis ſupereſt, quem excutit labore fabrili ferrario. Suaſi Pulverem rad. Valerian. per aliquot ſeptimanas utendum. Autumno Menſ. Octobris referebat ſe hucuſque à paroxyſmis immunem et optime valentem fuiſſe.

* "Une fille de quatorze ou quinze ans, tomba ſur le derriere de la tête en deſcendant un eſcalier; elle perdit connoiſſance et eut un ſaignement de nez: elle ſentit une violente doleur de tête qui dura pluſieurs jours, et

being followed by epilepſy,—the epilepſy being relieved by a continued ſuppuration of the part, in which the exfoliation was perhaps an accident, or the effect of art,—proves to my mind that this was merely an injury of the ſcalp. Nor can I find any difficulty, while we ſee ſuch periodical and diſtracting pains of the face, in Tic douloureux,—in wounds of the frontal nerve,—in punctures of the nerves of the arm, or ankle, in bleeding,—or, in the expoſure of nerves, in the cicatrix of a ſcar, or wound, in aſcribing theſe ſymptoms rather to an injury of the ſcalp, which may excite nervous diſorders, than to a caries of the bone, which we ſee daily unaccompanied with thoſe anomalous ſymptoms.

There is one circumſtance more which has often ſtruck me as ſingular. I mean

pour laquelle elle ſe fit ſaigner pluſieurs fois, tant du bras que du pied. Ces ſaignées la ſoulagerent beaucoup ; il lui reſta néanmoins une douleur fixe derriere la tête, qui d'abord fut aſſez ſupportable pendant quinze jours, mais elle augmenta enſuite conſiderablément, et prenoit par des accès reguliers. Lorſque cette fille ſe frottoit un peu fort le derriere de la tête, elle tomboit en ſyncope : independamment de cet accident, il lui arrivoit depuis que la douleur avoit augmenté, des mouvemens epileptiques huit ou dix fois par jours. M. Gervais examina l'endroit ou elle ſentoit cette douleur ; il remarqua une petite tache noirâtre à la peau, ſur la partie moyenne et ſuperieure de l'occipital : la peau etoit plus molle en cet endroit qu'ailleurs, elle paroiſſoit même comme contuſe : M. Gervais y appuya le doigt un peu fort, la malade tomba en ſyncope ; il ne s'imagina pas d'abord qu'un tel accident fut l'effet de cette preſſion : il recommença quand la ſyncope fut paſſée à appuyer le doigt au même endroit, pour bien examiner ſi il n'y ſentiroit point quelque derangement, la malade tomba encore dans le même etat ; alors il commença à ſoupçonner que c'etoit lui-même qui cauſoit cette ſyncope et pour mieux s'en aſſurer, il appuya ſur le même endroit une troiſieme et quatrieme fois, et chaque fois le même accident arriva. On eſſaya en vain de guerir cette fille par des remedes ; il fut enfin decide dans une conſultation qu'on decouvriroit cet endroit douloureux. On trouva le pericrâne detache de l'os qui etoit altere. Les accidens continuerent encore apres que l'os fut decouvert. M. Gervais balança alors pour le trepan ; cependant il crut pouvoir l'eviter, dans l'idee que l'exfoliation pouvoit ſuffire : en effet des que la piece d'os alteree fut exfoliee, tous les accidens diſparurent ſans retour. Scultet rapporte une cure à peu pres ſemblable. Un jeune garçon age de ſept ans tomba ſur la tête, et ſe fit une contuſion au cote du ſinciput, qui fut ſuivie de douleur et de convulſions : on calma, dit-il, auſſi-tot ces accidens par le moyen d'une peau d'agneau récemment écorché, qu'on appliqua ſur la tête de cet enfant ; mais cette douleur et ces convulſions ſe renouvelloient reguliérement à toutes les nouvelles lunes, ce qui obligea notre auteur, environ quatre mois apres le coup, à ouvrir l'endroit qui avoit été frappé, dans le ſoupçon qu'il y avoit une humeur entre le péricrâne et l'os qui corrodoit ces parties : il trouva le crâne noir et âpre ; l'endroit altere fut rugine ; il ſe couvrit enſuite de bonnes chairs, et l'enfant fut parfaitement gueri en peu de tems. Foreſtus rapporte une obſervation de même genre : ce ne fut que pluſieurs annees apres une bleſſure à la tête, qu'on s'aviſa de decouvrir l'os pour guerir une douleur violente et fixe qui duroit depuis le coup, et qui ceſſa en effet par cette operation." The caſe from Scultus, and that from Marchetti, have no connection, under heaven, with this ſubject. They are ſtuck in here as ornaments, not as analogies. They are caſes of ſuppuration, and (Marchetti's) of direct wounds of the brain itſelf, with a ſtilletto.

the extreme depreſſion of bodily ſtrength, and dejection of ſpirits, which often follows an injury of the ſcalp. I have ſeen patients fall into a ſort of hypochondriaſis, from which no exertion of ſpirits, nor native good ſenſe, could extricate them. The caſe of the Chevalier d'Entragues, an officer of rank in the French ſervice, is a lively pourtraiture of what every obſerving practitioner muſt have remarked in caſes leſs ſingular.

" The Chevalier d'Entragues, Colonel of the regiment of Bagey, was quartered (ſays La Motte) in our city; and, on entering his houſe one day, he ſtruck his head againſt the door-poſt, but ſo ſlightly that it merely knocked off his hat, and he felt nothing but the ſlighteſt pain. Yet, ſlight as the pain was, he paſſed a ſleepleſs night, and in the morning requeſted my advice. I found him low, with a feeble pulſe, and a ſlight pain in the head, at the meeting of the coronal and ſagittal ſutures. I bled him freely, and as upon ſhaving the head I found no mark of violence, no contuſion ecchymoſis, nor even redneſs of the ſkin, I thought it ſufficient to embrocate his head with oil of roſes, and ſpirits, laying over all a compreſs dipped in hot wine. He ſo entirely loſt his appetite, that he could take nothing but an egg, or a little ſoup, and he was confined to bed, with a ſort of vertigo. I was obliged to bleed and purge him, and give him a tea made of vulnerary herbs. I bled him thrice, and the pain gradually leſſened, till in ten days it vaniſhed *."

" He now propoſed to call Mr Troublet from Paris to viſit him, but the memorial which I wrote to Mr T. was ſo ſatisfactory to him, that, having commended my

* " Au mois de Février 1707, Monſieur le Chevalier d'Entragues, colonel du régiment de Bugey, qui étoit en quartier dans notre ville, entrant dans une maiſon, ſe heurta le deſſus de la tête, en gliſſant, contre le haut de la porte, qui fit tomber ſon chapeau, ſans qu'il ſouffrit dans le moment qu'une douleur ſi légere, qu'il ne s'en plaignit aucunement; cependant quelque leger qu'eut été ce coup, il l'empêcha de dormir la nuit ſuivante; ce qui le porta à m'envoier prier le matin de l'aller voir. Je lui trouvai le pouls très-foible, et une legere douleur qui occupoit le haut de la tête, dans le progrés de laquelle les ſutures coronale et ſagittale étoient compriſes en partie. Je lui fis une grande ſaignée; et comme, aprés lui avoir raſé la tête, je ne lui trouvai à l'endroit de cette douleur ni contuſion, ni écchymoſe, pas même de rougeur, je me contentai, pour tout remede, d'une embrocation d'huile roſat et d'eau-de-vie, avec une compreſſe en quatre doubles, trempée dans le vin tiéde, par-deſſus. Ce malade perdit l'appétit, de maniere qu'il fut obligé de ſe réduire au ſeul uſage des bouillons et des œufs frais, et de garder le lit pendant quelques jours, à cauſe d'une eſpece de tournoiement ou vertige, dont cette foibleſſe fut ſuivie; ce qui me détermina à le ſaigner encore trois fois, lui donnant des lavemens tous les jours, et un verre de vulneraires, en forme de thé, l'apres-midi; et comme la douleur diminua de jour en jour, de maniere qu'en dix jours elle diſparut entierement, je me bornai à une fomentation d'eau de la Reine d'Hongrie ſur toute de la tête."

proceedings, he declined to come, and committed the entire care of this gentleman to me in the moſt flattering terms. Yet, ſlight as the occaſion of this diſorder was, he was long in ſo low a condition, that I was alarmed for his life. He was extremely feeble, melancholic, and ſorrowful, and continued in this condition four months."

This caſe he concludes with the following reflections: "There was not, perhaps, in the armies of France, a more ſpirited, nor a ſtouter man, than Le Chevalier d'Entragues, who yet had nearly died of an accident ſeemingly very unimportant. For three months, the ſymptoms were as ominous as in the deepeſt and moſt dangerous wounds; conſequences which aſſuredly had ariſen from the pain of the perioſteum, communicated through the ſutures to the dura mater and brain. By theſe communicating fibres of the pericranium, the nervous ſyſtem was irritated, ſo that the animal ſpirits, moving no longer in their uſual regularity and order, the patient's whole ſyſtem was weakened, and was re-eſtabliſhed again, when the ſpirits were made to reſume their due courſe, the ſoul then finding itſelf free." "To the oil of roſes I had joined ſpirits of wine in the embrocation; that by the ſubtilty of the ſpirits in opening the pores, the oil might be enabled to penetrate deep, and relax the tenſe and diſtended fibres of the perioſteum, which communicates through the ſutures with the dura mater, in which conſiſts the painful affections of the part, and the conſequent diſorder of the animal ſpirits *."

This gentleman died afterwards at the ſiege of Cremona, leading on the French troops with great bravery; and in his caſe, Mr La Motte ſeems equally proud of his philoſophy, his ſchool-learning, and his practice; but it is not to expoſe theſe that I quote his words, but to prove that the impreſſion reſted on his mind of this being an injury of the perioſteum, and that the complaints were nervous, as truly ſo as if they had been accompanied with convulſive and thrilling ſenſations, mentioned in the other caſes. However you may conſtrue the caſe, whatever judgement you may be inclined to form of the ſtrict regimen, and profuſe evacua-

* "Je joignis l'huile roſat à l'eau-de-vie, pour faire un liniment ſur la partie douloureuſe, dans l'intention que l'eau-de-vie, en ouvrant les pores des tégumens, fit pénétrer les parties onctueuſes de l'huile plus avant, afin d'amollir et de relâcher les fibres tendues du périoſte, qui ſe communiquent à la dure-mere par les ſutures, en quoi conſiſtoit le ſentiment douloureux de cette partie, et le dérangement que ſouffroient les eſprits; moien des fibres du périoſte qui paſſent au-travers des ſutures, dont le genre nerveux ſe ſentit irrité; enſorte que les eſprits ne ſe diſtribuant plus comme ils avoient de coûtume, le corps du bleſſé s'affoiblit, et il ne ſe rétablit que lorſque ces mêmes eſprits eurent repris leur route ordinaire, pour ſe diſtribuer à touts les parties du corps comme auparavant; et par ce moien les fonctions de l'ame ſe trouverent parfaitement libres," &c.

tions, of which I cannot approve, it is fit you ſhould be acquainted with this hypochondriacal lowneſs which ſo often follows wounds of the head, and is more frequent than epileptic or nervous feelings. It is a phenomenon which will often preſent itſelf to you, and you will remember it as the cauſe of thoſe idle ſpeculations of the ancients about the nervous nature of the pericranium, and its communications through the ſutures with the brain *.

Nothing is wanting to complete the hiſtory of theſe ſingular affections, ſo plainly reſembling the Tic Douloureux, and the injury ariſing from bleeding, but a proof, that the inciſion which, in the preſent, as in thoſe other nervous complaints, brings relief, neither opens any latent abſceſs, nor uncovers any corrupted bone, and can have, indeed, no poſſible effect but that of cutting acroſs the morbid nerves. " Magdelaine Mondet, a native of Lyons, twenty-two years of age, and married, was attached with her huſband to a troop of Charlatans: while they were exerciſing their craft in a little village in Dauphiny, her father, in a fit of anger, threw a ſtool at her head, and ſtruck her behind the ear, immediately above the maſtoid proceſs: though there was no outward wound, ſhe fell down, lay inſenſible, and all the ſymptoms were ſo alarming, that a phyſician from Grenoble, who viſited her four days after, declared that ſhe ſhould be trepanned. She recovered, however, without any operation, except that a pain continued, which extended from the injured part to the forehead and orbit. From this period, during four years the pain gradually leſſened; at the end of which period ſhe again returned to Lyons, apparently in

* " Une plaie contuſe des tegumens du crâne eſt quelquefois ſuivie de douleurs fixes ou vagues, de ſpaſmes, de convulſions qui ſubſiſtent long-temps après la guériſon apparente, et qui ont leur ſiège dans l'endroit même qui a été frappé. On y trouve ordinairement une rougeur plus ou moins vive, un peu de bouffiſſure, ou un point douloreux qui augmente par la preſſion du doigt. Dans quelques malades ces douleurs nerveuſes ont une intenſité plus ou moins grande, ſelon les variations de l'atmoſphère, et ſe préſentent ſous la forme du clou hyſtérique, du rheumatiſme chronique qui a ſon ſiège dans l'aponeuroſe occipito-frontale. Quelquefois ce ſont de véritables accès d'epilepſie. En voice des exemples. Une femme eut des mouvemens convulſifs dans tous les muſcles de la face, et des douleurs de tête cruelles pendant dix ans, pour avoir été heurtée rudement par le rebord d'un gueridon, à la partie inferieure de l'orbite, ſur le trajet du nerf ſous-orbitaire.

" Une autre femme tomba à la renverſe, et fut frappée à la région cervicale et à la partie droite du front. Elle reſſentit ſur le champ des douleurs très-vives dans l'endroit de la tête oppoſé ou coup. Les douleurs augmenterent malgré l'uſage de différens remèdes. C'etoit tantot le cou, tantot la mâchoire ſupérieure ou l'inférieure, et quelquefois la pointe de la langue qui devenoit le ſiège de douleurs lancinantes et très-aigues. Il ne ſe manifeſta jamais la plus legère tumeur. Quand les accès ceſſoient, il ſortoit par la bouche une eau ſalée et jaunâtre, et ſous les muſcles étoient durs et tendus. Cette maladie ſubſiſta pendant pluſieurs années."

perfect health. Some time after her return, ſhe was attacked with a ſevere rheumatic pain of the wriſt, oppoſite to that ſide of the head in which ſhe had received the injury.

" After ſome violent altercations with her married ſiſter, ſhe abandoned herſelf to ſuch exceſs of fury, that ſhe reſolved inſtantly to drown herſelf; and, being overtaken and held, ſhe fell down without ſenſe or motion; and when ſhe revived, was paralytic on one ſide, that oppoſite to the original injury, and it was accompanied with loſs of voice, difficulty of deglutition, and even an oppreſſion of breathing. In this condition was ſhe carried to the Hotel-Dieu, where, by bleeding, baths, bliſters, and other means, ſhe recovered her ſpeech, her breathing became eaſy, but ſtill, to the very end of her complaint, ſhe faultered in her ſpeech, and the paralyſis continued, with a total loſs of ſenſe, as well as motion, in the parts. A month after her admiſſion, the palſy affected the right leg alſo, and gradually the whole body, except the right arm, the neck, and that ſide of the head. Though ſhe faultered much in her ſpeech, ſhe was intelligible, and her chief complaint was of vertigo, and of violent pains in the right ſide of the head, round the right eye. But this happily continued but a fortnight, when ſhe recovered by degrees, firſt the power of the right ſide, then her ſleep, appetite, and ſpirits, and in fifteen days more, the left ſide alſo was ſo free, that ſhe could walk through the ward with the help of ſtilts.

" We believed this woman quite reſtored, when, in the third week, ſhe had a relapſe more alarming than any of the preceding. She became univerſally paralytic, ſpeechleſs, and motionleſs, the neck, and one half of the face, only remaining free; but this laſted one day only, after which ſhe began to mutter. The difficulty of breathing and ſwallowing were as great as ever; and ſhe ſoon fell into a raging delirium, accompanied with convulſions; and during this fever, ſhe ſo far recovered the uſe of her right hand, as to rid herſelf eaſily of thoſe who attempted to hold her. The convulſion was ſo violent, that from time to time her head was ſo bent down as to touch her feet; and more than once ſhe would have projected herſelf from the foot of the bed, and ſtruck her head againſt the counterpane, if ſhe had not been confined in a ſtrait jacket.

" She ſtruggled three days in this furious condition, and appearing on the third day to be near her end, the laſt ſacrament was adminiſtered: On the fourth, the delirium ceaſed; and on the morning of the fifth, I ſaw her, and, ſtruck with the

capricious and anomalous nature of thefe figns, I repeated many of the queftions which I had formerly afked, and now, for the firft time, fhe mentioned, amidft a variety of replies, that fhe had formerly got a blow on the back of the head. I requefted to fee the place, and found it covered with hair as long and beautiful as any other part of the fcalp; and, preffing with my thumb rather ftrongly along the part, to fee whether there was any fwelling, fhe was feized with a more violent convulfion than we had yet witneffed; fhe even fainted; and, upon repeating the preffure, it produced a convulfion as violent as a fhock of epilepfy. She foamed at the mouth more than ufual, and complained that the violence of the pain fhe had fuffered feemed to fhoot through the head from the part preffed upon to the angle of the eye. I told her, that fince phyfic feemed to have no power over her malady, it appeared to me that fhe had no refource but in operation; a fuggeftion which, from her extreme fufferings, fhe received with pleafure. When I communicated this information, (hitherto unfufpected), to the phyfician, Dr Chol, he did not oppofe my intended operation.

" I ordered the pained part to be fhaved, an operation very difficultly completed, for the drawing of the razor over the part excited the convulfions. The fhaved part was of a lively red colour, which I could not but afcribe to the razor, fince there was no fwelling. Well affured that the contufion of the cranium was the root of the evil, I made an incifion behind the ear three inches long, extending from the maftoid procefs upwards. The incifion went to the bone, excited no convulfion, was followed by no hemorrhagy, and was dreffed lightly with charpie. Half an hour had fcarcely elapfed, when a fifter of the houfe came running to inform me, that fhe was perfectly cured, that fhe had rifen without help, that fhe now fpoke and fwallowed with eafe; and indeed I found her report true, and had pleafure in feeting his unhappy creature without the flighteft remains of her palfy *."

Unlefs refpectable authors have been fo abandoned as to invent thefe details; fo ingenious and fkilful in lying, as to have contrived circumftances the moft fingular, inconceivable indeed, by any preceding analogy; we have all the proof we could defire of thefe anomalous, and very afflicting fymptoms, arifing from flight bruifes of the fcalp, and continuing and increafing for an indefinite term of years.

" A young man, (fays Pouteau), twenty-four years of age, with every mark of found health, fell from a window twenty feet high, and lighted on his head. This

* Pouteau, p. 282.

was at the age of eight years, and he lay for many hours without ſenſe or motion. He was bled, the uſual applications to the hurt part were not neglected, and he was entirely cured, ſaving only a painful feeling which continued in the part of the ſcalp that was moſt bruiſed.

" The period of his diſorder is much too long for him to recollect definitely every fluctuation of it; this, however, he cannot but remember, that he has ever ſince been afflicted with unremitting pains of the head, which ſome months ago, when he firſt conſulted me, became ſo poignant, that often he fell down ſenſeleſs in his chamber. By all that he ſays, I underſtand that his moſt acute pains are in the upper part of the right parietal bone, extending to the angle of the eye, the ſight of which is obſcured during the more violent paroxyſms of pain; and all the face, but eſpecially the right-ſide, is fluſhed with a painful and burning ſenſation.

" His hair is long and beautiful; an ornament which coſts him dear, for, every time the comb paſſes over the hurt part, the pains are exceſſive. The hairs are, at this part of the ſurface, peculiarly coarſe and ſtrong; they do not lie naturally, as in the other parts of the head, but briſtle up in a moſt irkſome way, when any accident excites the ſevere pains.

" The head being ſhaved at my requeſt, I perceive a degree of ſwelling, ſlight indeed, but accompanied with redneſs. The preſſure of the finger leaves no mark, but excites acute pains. I laid open all the affected part of the ſcalp and pericranium with a great crucial inciſion, and, having allowed a cup-full of blood to flow, dreſſed it up. From this time the pains ceaſed, and in a few days entirely vaniſhed, in conſequence of a ſerous and bloody diſcharge *." Theſe are a few of the obſer-

* " Magdélaine Mondet, quatre ans après le coup reçu, eſt tranſportée hors d'elle-même par le plus violent accès de colere. Les parties léſées par le coup n'en avoient perdu que depuis peu de tems l'impreſſion douloureuſe, et leur organiſation en étoit encore affoiblie. Dans ces circonſtances elles ſont accablées par un torrent de ſang; leurs vaiſſeaux dont le reſſort eſt affoibli, s'engorgent ſubitement et à l'excès; les filets nerveux avec leſquels ces vaiſſeaux ſont entrelaſſés, ſont tiraillés et irrités; l'impreſſion vive faite ſur ces nerfs, ſe communique de proche en proche juſqu'au cerveau même, ſuſpend et déroute le cours des eſprits animaux. La douleur occaſionée par la preſſion du doigt a produit, comme on l'a dit, les mêmes effets, et a eu les mêmes ſuits. Cette explication paroitra juſte, ſi on ajoute le ſuccès du moyen que j'ai employé pour la guériſon; l'inciſion fait aux téguments léſés en coupant les vaiſſeaux ſanguins et les filets nerveux, a vuidé les premiers et relaché les ſeconds, et auſſi-tot tous les accidents ont diſparu, et la guériſon a été ſi prompte et ſi entiere qu'il me parut démontré que la cauſe primitive de cette multiplicité des ſymptomes réſidoit toute entiere dans les parties extérieures de la tête. Ce n'eſt pas la ſeule occaſion ou j'aye obſervé combien les coups portés à la tête étoient dangereux, quoique leur impreſſion ne s'étendit pas au-dèlà des parties extérieures; l'obſervation ſuivante en eſt une preuve :

vations concerning this interefting ſubject, which I have thought it my duty to lay before you. They are enveloped in a thick huſk of doctrine about nerves, and ſpirits, and humours, which I will not weary you by tranſlating. I would neglect nothing ſo remarkable, ſo peculiar as this, and yet would ſpare you every unintereſting detail. Having pointed with deliberation, and, I hope, with preciſion and clearneſs, the various injuries of the ſcalp, I haſten now to a ſubject more intereſting in an infinite degree; I mean, the conſequences reſulting from ſeparation of the dura mater from the internal ſurface of the ſcull.

OF SEPARATION OF THE DURA MATER.

The blow which detaches the dura mater, may at the ſame time injure the integuments, or affect the ſcull; hence nothing ſeems more difficult than to aſcertain the ſimple conſequences of ſeparation of the dura mater, unallied with injury of the integuments or cranium. Yet I hope I ſhall be able, by a ſuite of facts, to prove, that the dura mater may be ſeparated even by a ſhock, without any direct injury to the ſcalp, or ſcull, and to explain to you all the varieties of this accident, and all its remote and unforeſeen conſequences.

" A little boy, of five years of age, fell from the firſt ſtorey of a ſtair, but lighted on his feet, and walked up ſtairs again, ſaying that he was not hurt; no impor-

" Au mois d'Octobre 1753, Mademoiſelle ***, âgée de vingt-deux ans, demeurant ſur le quai St Vincent, voulut prendre dans une Egliſe une chaiſe parmi pluſieurs autres qui étoient amoncelées; elle fut frappée en pluſieurs endroits de la tête par ces chaiſes qui écroulerent; Mademoiſelle *** ne fut qu'étourdie, elle ſe fit néanmoins ſaigner; malgré cette précaution elle fut ſujette depuis ce tems à des douleurs de tête continuelles qui augmentoient ou diminuoient ſuivant les variations de l'atmoſphere: elle fut encore ſaignée pluſieurs fois, et fit inutilement beaucoup d'autres remédes tant internes qu'externes; ſon embonpoint diminua conſidérablement.

" Je ne fus conſulté pour cette maladie qu'au bout d'un an. Après avoir fait raſer ſa tête, je découvris ſur l'un et l'autre parietal une eſpace rouge d'un pouce de diametre, la circonférence en étoit pâteuſe et légérement tumeſiée. Je fis ſur chaque contuſion une inciſion juſqu'à l'os, tranſverſale aux ramifications des nerfs et des vaiſſeaux, et les douleurs ceſſerent auſſi-tot.

" Un mois après, cette Demoiſelle reſſentit encore une douleur incommode vers l'occipital. La tête ayant été raſée de nouveau, je découvris une autre contuſion moins conſidérable que les deux autres, et qui étoit échappée à mes premieres recherches; je réitérai le même moyen, la guériſon fut parfaite, et s'eſt tres-bien ſoutenue depuis ce tems."

tunities, queſtions, nor threats on the part of his parents, could ever extort from him any other anſwer, than that he was not hurt; indeed, they had little reaſon for their anxiety, the boy appearing to enjoy, for three months, the moſt perfect health. But, at the end of the third month, he was ſeized with a violent headach, accompanied with a puffing up of the eye-lids, and fits of vomiting; and, when the ſurgeon was called, he found the face ſuffuſed with a purple colour, and the boy deprived of ſpeech, and able only to point with his hand to the place of the pain. He was bled in the arm without loſs of time; he grew worſe, and was, a few hours after, bled in the leg, but almoſt immediately, and before the orifice was cloſed he expired.

" Mr Caſaubon being called to open the body, found without the cranium nothing particular, except a ſlight puffineſs of the integuments; but, on opening the ſcull, he found an extenſive abſceſs betwixt the dura mater and the inner ſurface of the right parietal bone; but neither within the ſcull, nor in any other part of the body, was any thing remarkable obſerved *."

Here we have preſented for our conſideration, in a ſhort plain narrative, a ſuite of moſt important facts. *Firſt*, A boy falls from a great height upon his feet, as it would appear, in the preſence of his parents, but certainly upon his feet; and the dura mater is detached, not by a blow, which might at once injure the cranium, and ſhake the dura mater; it is detached by the ſhock merely, without any concomitant injury of the ſcull. *Secondly*, The integuments being ſound, the cranium unhurt, the parts not diſpoſed to run quickly into diſeaſe, the child continues in perfect health, and when he is ſuddenly ſeized with the fatal ſigns, there is ſtill no conſpi-

" * Au mois de Mars 1789, un enfant de cinq ans tomba ſur ſes pieds, d'un premier étage. Il remonta auſſitot, en diſant qu'il ne s'étoit fait aucun mal. Les queſtions, les menaces mêmes de ſes parens, n'en purent tirer d'autre réſponſe. On n'apperçut, en effet, aucune altération dans les fonctions, et l'enfant parut jouir de la meilleure ſanté, juſqu'à la fin du troiſieme mois. A cette époque, il fut tout-à-coup ſaiſi d'un violent mal-de-tête, accompagné de bouffiſſure aux paupieres et de nauſées. Le chirurgien, mandé alors, trouva le viſage d'un rouge violet. Le malade n'articuloit déjà plus; il indiquoit ſeulement avec la main l'endroit de la douleur. Il fut auſſi tot ſaigné du bras, et comme ſon état empiroit encore, on le ſaigna du pied, au boût de quelques heures, et il mourut un inſtant après.

" M. Caſaubon fut appellé pour faire l'ouverture du cadavre, et ce fut alors qu'il apprit les détails qu'on vient de rapporter. L'extérieur de la tête ne préſentoit de particulier, que la tuméfaction des tégumens; mais, à l'ouverture du crâne, on trouva un abſcès conſidérable entre la dure-mere et la partie ſupérieure-laterale-droite du coronal. L'examen le plus attentif ne fit découvrir d'ailleurs rien de remarquable, ni dans le reſte de cette cavité, ni dans les autres parties du corps.

cuous ſwelling of the integuments; and, when he dies, the cranium is found in its natural ſtate. *Thirdly*, It is remarkable, that here, as in almoſt every inſtance, the ſuppuration of this membrane is ſlow and inſidious in its progreſs; for this boy had continued three months in apparent health, no ſymptoms betrayed the danger: The parents had diſmiſſed their firſt anxieties and fears: yet all the while this fatal ſuppuration was ripening. The boy, the moment he is ſeized with the ſtupor, is gone, paſt remedy. The trepan could not then have ſaved him; the cauſe of this ſudden and fatal convulſion was diſcovered only after death. *Fourthly*, Though the ſuppuration was of conſiderable extent, (un abſces conſidérable), it had plainly ariſen from the mere ſeparation of the dura mater; for the dura mater alone was affected; long as it had been divorced from the cranium, neither was the cranium affected by this ſeparation, nor the brain by the diſeaſe of the membrane which immediately ſurrounds it; the ſeparated ſurface was alone purulent.

Yet I ſhould not, Gentlemen, aſcribe ſuch importance to a ſolitary caſe, nor attribute ſuch ſingular and unforeſeen conſequences to this general ſhock, were it not eaſy to prove the ſame fact in various ways. From the tender age of this little boy, he might have been unable, perhaps unwilling, to tell how he was affected by the ſhock; but others more intelligent have been immediately conſcious of the injury.

" A healthy man, born of ſound parents, and about thirty-five years of age, fell, in the month of December 1766, in going down the ſteps of the ſide-pavement of the Pont-neuf. His feet flew from under him; he fell perpendicularly on his breech; and it is a well-atteſted fact, (c'eſt un circonſtance bien conſtatée), that his breech only touched the ground, and ſuſtained the ſhock; and it is not leſs remarkable, that the moment he fell he felt his head ſo confuſed, that he could hardly get up. His fall was followed by no kind of pain. Mr Dupouy, a member of the French academy of ſurgery, knew him well, and had this relation from his own lips; was conſulted by him about theſe firſt conſequences of this concuſſion, and ſuggeſted ſome meaſures of prudence, to which Mr Gallois (the name of the patient), ſeems to have paid but ſlight attention. The confuſion of head continued unremittingly during four months, after which period it inſenſibly vaniſhed.

" After four months, or more, of undiſturbed quiet, his barber, in ſhaving his head, obſerved, in paſſing the razor over a particular ſpot on the top of the head, a dull ſound, which ſeemed to him very particular; it was a ſort of crepitation, like that of crumpled paper, or parchment, lying under the ſcalp; and, upon mentioning it to Mr Gallois, he was ſenſible, upon touching the part, of the ſame ſin-

gular feeling. At this time there was no inequality, neither rising nor depression of the part; the next day there was a tumor, the size of a half-crown piece, slightly elevated, and having a degree of pulsation; and, as it increased remarkably from day to day, he consulted several, and at last took the advice of one, who declared it an aneurism, and advised compression. A compress and bandage was applied; the tumor was easily repressed to the level of the perforation, in the parietal bone, but its pressure occasioned the most alarming insensibility. The compress was abandoned,—the tumor grew apace,—the opening in the parietal bone widened, and a number, both of physicians and surgeons, were invited, to consult upon the case. One only imagined it to be an aneurism; many regarded it as a proper hornia, or protusion of the brain; others, more prudent, suspended their opinions on a case so truly extraordinary. Mr Gallois was free from every suspicion of venereal taint; but as he remembered to have had scorbutic blotches in his younger days, the physicians were glad of this apology, (not knowing what else to prescribe), of prescribing antiscorbutic medicines.

"This course of antiscorbutics, far from interrupting the growth of the tumor, seemed to produce fever, and rather to augment its growth, for its increase seemed peculiarly rapid while he took these remedies. It rose to the size of a turkey's egg, and was painful, with this remarkable peculiarity, that a slight compression assuaged the pain. But, the insensibility which followed compression was such, that he was more willing to endure the pain, than be thus relieved. This gentleman, abandoned, in the last months of his existence, to all kinds of Empyrics, less weakened, perhaps, by their remedies, than dispirited by the melancholy prospect before him, fell gradually lower, in spirits and in strength, and expired on the 17th of April 1763.

"Mr Louis, without disordering the tumor, cut through the integuments, scull, and dura mater, with one circular incision; and having raised the whole, he found that the tumor, the size of a fist, grew from the surface of the dura mater; that it was of a regular circumscribed form, somewhat compressed, where it lay under the scull; more prominent, where it rose through the circular opening; and so far convex, as to make a corresponding depression in the surface of the brain. The lower surface of the dura mater was thickened, and its vessels enlarged, and almost varicose. The tumor had no adhesion to the opening in the cranium *."

This case, while it strengthens the preceding testimony, brings new and interest-

* Academie Chirurgie, tom. 5.

ing conclusions along with it. It brings the strongest conviction home to the mind, that not only a direct blow upon the head, but any shock, will detach the dura mater, which, if the patient survive, must generally draw after it the death of the scull; for, the internal surface of the scull is in the same critical state that the external surface was, when the integuments, (under the regimen of the older surgery), were either cut away, or dressed apart from the scull, till the surgeon was gratified, and his conscience composed, by an entire exfoliation of the suspected bone. It shows, that a person of adult years, and attentive to their own feelings, can distinguish the ill consequences of the shock. In this case is marked, in a peculiar manner, the slow progress of such diseases, and the long interval of doubtful health, and indefinite feelings of something disordered, which precedes the more desperate symptoms; and it proves, above all, a new and interesting fact in the pathology of the dura mater, viz. that, after a separation of the dura mater, when the matter is absorbed,—when the surface of the membrane is healed, without being re-united, —when the first symptoms have, as in this case, ceased, the membrane is disposed to form warty, or fungous tumors, which, by their pressure, affect the scull.

In one of the following states and conditions, the dura mater always must be after a violent separation from the internal surface of the scull: *First*, Either, the bone being hurt, (as generally happens, in cases where it is shaken by a blow), the dura mater cannot re-unite, its surface will suppurate, and the patient die, with shiverings, stupor, and palsy; or, *secondly*, the dura mater may continue separate, and yet its surface heal, but with a disposition to form these fungi, which betray its unhealthy condition; for the cranium, by pressure on its lower surface, becomes carious, part of it is absorbed, the fungus begins to protrude through a small circular opening, and the fatal sign of pulsation in the tumor, is felt, which pulsation is, indeed, the motion of the brain: Then the opening enlarges, the fungus increases, the brain is at the same time diseased, and sometimes suppurates, and the patient, seized with stupor,—with epilepsy,—sometimes with howlings, and the most horrible convulsions,—expires. But, *thirdly*, it occasionally, perhaps often happens, that the dura mater, though completely separated, is, after an interval of danger, re-united with the scull, and by a process which at once thickens the membrane, and re-unites it to the scull with peculiar firmness, the difference betwixt the attachment of the natural and lacerated portion being too palpable to be overlooked. But these are accidents which will come out in proof spontaneously; allow me, now, to call your attention to the circumstances of this individual case; reflect on them, and you will find, that they admit but of one simple theory: viz. that the dura mater was separated by the shock;—that while the dura mater was in a

ſtate of ſuppuration, there was a period of danger, accompanied with confuſed feeling, which did not ceaſe for four months;—that the dura mater, though healed, was not found; it continued ſeparate from the ſcull; tuberculous tumors were formed on its ſurface; the ſcull, by a ſlight preſſure in this unnatural ſtate, became carious, ulcerated, and was ſo far eroded, as to allow the tumor to protrude;—the ſcalp (lying over a bone thus diſeaſed) did not riſe into that prominent, circumſcribed, puffy tumor, which marks a recent injury, and which is produced by putrid air, incloſed within diſeaſed cellular ſubſtance, but was dry, and crepitating, like rumpled paper, a phenomenon well correſponding with the preſumed condition of theſe integuments, outwardly alive, and not much diſtended with ſwelling, but inwardly diſeaſed, or rather dead,—and holding no connection with the ſcull, merely covering a tumor, unconnected with it, and, in ſhort, truly that which it is in the report ſaid only to reſemble, *parchment*, *dead ſkin!*"

This caſe reminds us, that bone is a perpetual ſecretion; that its earthy matter is in continual circulation, alternately ſecreted, and re-abſorbed; that whatever accelerates the action of its ſecreting arteries, as blows, ill-united fractures, or other injuries, excites them ſometimes to form enormous tumors; while, on the contrary, every tumor, foreign to the bone itſelf, having no connection with the vaſcular ſyſtem of the bone, ſo as to excite its arteries, hinders their lively action, by preſſing upon them, prevents their ſecretion, and waſtes the bone. It is by preſſure on one ſide, that bones (as in the cervature of the ſpine) are diſtorted. It is by preſſure that lame ſailors, and other ſcoundrally mendicants, almoſt annihilate the bones of their leg, diſtort the foot, and ſqueeze the tibia and fibula cloſe together. It is by preſſure that a bone without ulcerating diminiſhes in ſize, and becomes ſoft as wax; and thence it often happens, that the bone lying under the oppreſſion of any great tumor, cuts, (during operation, or in diſſection), like wax.

In the German Ephimerides, is to be found another caſe ſtill more intereſting, and farther confirming this ſingular fact of the ſeparation of the dura mater by a general ſhock; and of that ſurface which remains detached, forming fungi, and deſtroying the ſcull. "This man was about fifty-one years of age, fell from his horſe, and was ſenſible of a violent concuſſion of the head; a diſtreſſing pain enſued, but it ſoon vaniſhed, and the patient thought no longer of his fall, nor of this pain. About four years after, he became conſcious of a loſs of memory; and this malady increaſed ſo from day to day, that he at laſt forgot what he had ſaid or done the mo-

ment before. Then came cruel and inceſſant fits of epilepſy. Thoſe paroxyſms ſeemed for ſix months to be appeaſed by the medicines he took; but there followed next pains of the head, excruciating, unremitting, and continual, which no remedy could alleviate, and which in ſix months more proved fatal; and ſo dreadful were theſe pains which affected the left ſide of his head, in the form of megrim, that the left eye was convulſively turned in its ſocket, by the exceſs of pain.

" On opening the ſcull, the middle and fore part of the right parietal was carious, and deſtroyed in a ſpace equal to the ſize of a half-crown. Leſſer ſpots of caries were obſerved in various parts of the ſcull-cap, while the left parietal was corrupted by a fungous excreſcence from the dura mater, which extended towards the orbit, and had deſtroyed alſo the cribriform plate of the œthmoid bone."

Here we ſee again the ſudden ſhock ſeparating the dura mater, perhaps to a great extent from the ſcull. The bone dying, and falling into general diſeaſe, by the loſs of its nouriſhing membrane; and that fungus, (which it ſeems the peculiar diſpoſition of the dura mater to produce, when healed apart from the cranium), deſtroying the parietal bone, making its way through the thin plate of the œthmoid bone, and cauſing death before it had growth ſufficient to produce an external tumor.

It ſeems to me, that every cauſe which ſeparates the dura mater, and keeps it ſeparate, whether that cauſe be a caries of the bone, from a blow,—a ſlow and ſpontaneous caries, from diſeaſe,—or a febrile caries, from cold,—has often the ſame effect with the ſeparation of that membrane by a ſhock.

" A woman of forty-five years of age, fell upon a beam, and ſuffered a ſevere contuſion in the head. The pain which followed was yet very ſlight, and ſoon vaniſhed. A tumor, the ſize of a filbert, appeared, and continued ſtationary for twelve years, without trouble or pain; when, in conſequence of recent bruiſes, the tumor grew daily, till it attained to the ſize of thirteen inches in diameter, and ſeven in heighth, occupying the whole of the left parietal bone, encroaching alſo a little upon the right, towering to ſuch a height, as to reſemble the head of a new-born child. So rapid was its growth from day to day, and the pain was ſo acute, that it was judged that no time ſhould be loſt in ridding this woman of her tumor, and, as there was felt a deep-ſeated pulſation, it was judged right, for fear of hemorrhagy, to apply rather a ligature, and decline operating with the knife.

" The ſurgeon, accordingly, put a ſilk cord round the tumor, which he lightened more or leſs daily, according to the degree of pain, until the fourteenth day,

when the root of the tumor, meafuring only an inch in diameter, was cut acrofs with a knife. The mafs of the tumor weighed four pounds, fix ounces; and, it was now feen, that the fcull was carious through both its tables, and that the pulfation was that of the brain communicated through the tumor, raifing the bafis of it at every ftroke. In a few weeks, the patient was feized with convulfive motions of all the oppofite fide, and her death was immediately preceded by violent convulfive ftruggles, which lafted fix hours.

" On examining the head, the caries was found extremely irregular in its border, forming an opening from four to five inches in diameter, while various fpiculæ, projecting from the borders of this opening, transfixed the fungus. The dura mater itfelf was found and clean, without fpot or blemifh; but where the fungus rofe from its furface, it was greatly thickened in its fubftance, (to three times its natural thicknefs), and had formed infeparable adhefions with the brain and pia mater *."

I fhould now call your attention to the ferious and important purpofe of this part of my difcourfe, to teach you how to form a juft prognoftic in thefe cafes, and to mark the inevitable confequences of fuch ill-judged operations; but that I think there is one circumftance concerning the feparation of the dura mater ftill unexplained, which it will be gratifying, and perhaps ufeful, for you to underftand. We are at no lofs, you will obferve, to afcertain thofe effects of the feparation of the dura mater, when that feparation is immediately fatal, or when tumors are formed upon its furface, and the patient's fufferings protracted for years. But when, in place of proceeding to fuppuration, or giving rife to tumors, the dura mater, after a flight fuppuration, is re-united with the fcull, and the patient reftored to health; by what figns, or appearances, fhall we know that the membrane has been thus feparated and re-united? It may not be, in itfelf, a matter of effential importance to afcertain this fact, but it will give us confidence in all our other conclufions, if we can fatisfy ourfelves, *firft*, that the dura mater, when feparated by a blow, generally fuppurates; *fecondly*, that when fhaken by a general fhock, it fometimes heals apart from the fcull, and fhoots out from that furface which was once connected with the fcull, fungous tumours, which deftroy it. *Thirdly*, That the flow feceffion of the dura mater from a corrupted bone, alfo leaves its furface in a condition prone to the generation of fungi: And, *finally*, that there is reafon to believe, that the

* Academie de Chirurgie, tom. 5. p. 52.

dura mater, which re-unites ſo eaſily with the outer ſurface of the ſcull, in caſes of fracture, is alſo often ſeparated by ſhocks, or blows, (which produce only ſlight confuſion, and very tranſient ſickneſs or pain), and *re-unites*, without the ſlighteſt ſuſpicion, on the part of the ſurgeon, that any derangement, ſo dangerous as the ſeparation of the dura mater, had been produced.

" A dragoon, about forty years of age, fell from his horſe, and, from that moment, during the ten years that he ſurvived, he felt, after every ſlight irregularity, a burning heat in the cheſt, and oppreſſion of breathing, amounting almoſt to ſuffocation. Yet, he did his duty all along, as a ſoldier, with alacrity.

" One day, while ſtanding centinel, he was, without any prediſpoſing cauſe, ſeized with his uſual pain, accompanied with ſuch oppreſſion of breathing, that he was carried to the hoſpital, almoſt ſuffocated; and there, after being bled, and taking a little of a pectoral ſyrup, he almoſt inſtantly expired.

" On the inner ſurface of the cranium, where the great arteries of the dura mater make their impreſſion, and where theſe furrows uſually ceaſe, there was, on each ſide, a large hollow, capable of containing a wallnut, and each hollow was filled with a large tubercle, proceeding from the ſurface of the dura mater, and adhering very firmly to the bone; and it was eſpecially remarkable, that the dura mater adhered, on the right-ſide of the vertex, ſo very firmly to the inner ſurface of the ſcull, that it could not be ſeparated without the greateſt difficulty; while, on its lower ſurface, it adhered with equal firmneſs to the pia mater beneath.

" This unnatural adheſion of the dura mater to both the pia mater and ſcull, was plainly no other than the cicatrix of ſome former ſeparation; for, the lower ſurface of the parietal bone, correſponding with this adheſion, was irregularly callous *."

* " Cataphractarius, 40. annorum, ex equo delapſus, ab eo tempore, per decem dein annos, a quocunque abuſu rerum non naturalium, ardorem pectoris, et reſpirationem difficilem, ad ſuffocationem uſque, perpeſſus eſt.

" Toto tamen iſto tempore munera ſua militaria alacriter peregit.

" Tandem, excubias agens, nullius cauſæ procatarcticæ conſcius dolore prædicto, et tanta ſimul reſpirandi difficultate corripitur, ut fere jam ſuffocatus ad valetudinarium deferretur; ubi poſt adminiſtratam ipſi venæ ſectionem, et exhibitam mixturam pectoralem reſolventem, brevi animam egit et efflavit.

" In parte interna ollæ cranii, ubi arteriæ duræ matris ſulcos eidem imprimere ſolent, et ubi alias hi ſulci in oſſe bregmatis evaneſcunt, ex utroque latere cavitas inſculpta aderat, quarum ſingula nucem juglandum capiebat.

" His duabus cavitatibus reſpondebant duo tubercula ex dura matre prominentia, eaſdemque perfecti replentia, iiſque valida adhæſioni adnata. Præterea dura mater ex dextro verticis latere *cum hæmicranio ita valide cohæſit, ut hoc difficillime ab illa avelli potuerit. In eodem loco dura mater inferius cum ſubjecta pia matre ſimiliter cohæſit.*

Be aſſured, that in ſpeaking thus particularly of tumors proceeding from within the ſcull, I have been inſenſibly led on to this ſubject, by conſidering the various conſequences of this ſeparation of the dura mater; that I have not entered into this detail, merely that I might explain the philoſophy of theſe caſes; nor do I ſearch the records of medicine, for tales of miſcarriage and imprudence, calculated to raiſe or to gratify a petulant temper, to ſtain the reputation of great men, "To ſtrike the monuments where noble names lie ſleeping." By thoſe memorable anecdotes which I am now going to relate, I mean merely to acquit myſelf of an important duty; to impreſs you with juſt and ſerious fears of entering upon any ſurgical enterpriſe, where ſuch tumors ariſe from within the ſcull. The caſes which I have already detailed, are not merely deſtined to adorn the works of a learned ſociety, or to be a matter of ſtupid wonder, but to ſerve as uſeful warnings; they are forms of diſeaſe, horrible, indeed, in their concluſion, but in their beginnings hardly to be diſtinguiſhed from the moſt trivial tumors; and, that ſurgeon is in great danger, who does not, from reaſon and reflection, (for experience few can have in ſuch rare caſes), form a decided opinion the moment ſuch a tumor is expoſed, who does not reſolve, with a ſteadineſs not to be ſhaken, "not to touch it for the world." The good that can be done is problematical, the danger dreadful; and the ſurgeon who but allows himſelf to conſult upon ſuch a caſe, or to hearken to the intreaties of a patient wearied of life, is in danger of robbing him of life. The diſeaſe, it muſt be acknowledged, is fatal in the courſe of nature, yet, wherever operations have been attempted, the patients have been directly put to death by the hands of the ſurgeon.

"In the year 1697, a man preſented himſelf at the Hotel-Dieu, of forty years of age, having a firm but pulſating tumor, covering almoſt all the parietal region, and towering to three inches in height. He had been diſtracted with pains for a year; during ſix months he had been blind, and was now almoſt deaf. Mr Sivert, who received him, conſulted with Mr Joſeph Petit; they found it imprudent to make inciſion into ſuch a tumor; perhaps they apprehended it to be an aneuriſm; and it is expreſsly mentioned in the narrative, that they feared leſt he ſhould bleed to death. Veneſection and purging ſeemed but to aggravate his ſufferings; when at laſt, exhauſted by his torments night and day, and driven to utter deſpair, he beſought them, he demanded, that ſome operation ſhould be performed, and declared, that if they refuſed his intreaties, he would cleave this tumor with his kniſe. They

"Atque hæc præternaturalis duræ matris cum cranio, *ac pia matre, cohæſio nihil aliud quam cicatrix poſt vulnus relicta, fuiſſe videbatur.* Nam in oſſe bregmatis calloſa inæqualitas eidem correſpondens cernebatur."—*Baader.*

complied. The apex only of the tumor was opened with a ſcalpel; nothing iſſued but florid blood, which, in ſpite of compreſſion with bandages, and the preſſure of the hand, continued to flow for two days inceſſantly. He died on the ſecond day *."

" A ſoldier, while confined to the hoſpital in Straſbourg, by a ſwelling of the thigh and haunch, was ſenſible that a ſmall loupy tumor, ſeated on the forehead betwixt the eyes, was increaſing rapidly, but without pain. While the ſurgeons applied reſolving embrocations and cataplaſms, it increaſed ſo as to depreſs the upper eye-lid, and cloſe the eyes. Mr Le Mair, ſurgeon to the military hoſpital, a man eſteemed for diſcretion and good ſenſe, propoſed to the patient to have the tumor opened. He conſented; a crucial inciſion being made, diſplayed a white, ſpongy, and fungous-like maſs of fleſh, quite inſulated. The fingers could be turned entirely round it, and one finger could even be introduced within the cranium, till the dura mater and its pulſations were ſenſibly felt. Inſtantly after this operation, the man fell into a profound lethargy, from which he never awoke, but expired on the fifth day!

" On diſſection, the frontal bone was found diſſolved by the preſſure of the tumor, which had alſo made a deep impreſſion on the ſubſtance of the brain."

Mr Le Grand mentions the caſe of a gentleman belonging to the Court of Bruſſels, who had venereal chancres, which had now been fairly cured. This was in the

* " Le 29 Mars 1697, il vint à l'Hotel-Dieu un homme de quarante ans, avec une tumeur conſidérable qui occupoit preſque toute la région du pariétal gauche; elle avoit trois pouces d'élévation; ſa conſiſtance étoit aſſez ferme, et elle avoit des pulſations. On en attribuoit la cauſe à une douleur de tête très-violente que le malade ſouffroit depuis plus d'un an; qui l'avoit rendu aveugle depuis ſix mois, et ſourd de l'oreille gauche. M. Sivert, aux ſoins de qui ce malade fut confié, prit l'avis de Joſeph Petit, chirurgien en chef de cette maiſon, célèbre praticien de ſon temps, qui après avoir bien examiné la tumeur, prononça qu'il ne falloit pas l'ouvrir, que les os étoient cariés, et qu'en faiſant une inciſion, il y auroit riſque d'une hémorrhagie qu'on ne pourroit arrêter; peut-être avoit il l'idée que la tumeur étoit anéuriſmale; l'obſervation ne le dit point. Quoiqu'il en ſoit, on ſaigna et on purgea le malade dans l'intention de calmer ſes douleurs de tête; elles parurent, au contraire, augmenter conſidérablement à la ſuite de ces ſecours; cet homme déſeſpéré de n'avoir aucun repos ni nuit, ni jour, demandoit inſtamment qu'on l'opérât, ſinon qu'il fendroit la tumeur avec ſon couteau; on prit le parti de lui donner la ſatisfaction qu'il ſouhaitoit ſi ardemment. La pointe de la tumeur fut inciſée avec un biſtouri; il n'en ſortit que du ſang artériel; malgré l'appareil convenable et la précaution de le contenir par une compreſſion faite avec la main, le ſang continua de ſuinter, et le malade mourut deux jours après.

" A l'ouverture du crâne, on trouva l'os pariétal gauche tout à-fait rongé; une fongoſité adhérente à la dure-mere traverſoit la carie, et étoit percée de toutes parts par des pointes oſſeuſes qui entroient dans la ſubſtance. Il y avoit deux autres éminences charnues à la dure-mere; l'une ſous le coronal, l'autre ſous l'occipital, aux parties antérieure et poſtérieure de la déperdition du pariétal; elles comprimoient le cerveau, qui d'ailleurs étoit dans l'état naturel. La faux avoit acquis beaucoup d'épaiſſeur.

year 1758; and, in a little while, he perceived a ſwelling on the crown of the head, in the place of the ſagittal ſuture, which was very little noticed; it was flat, and yet was miſtaken for a loupy tumor. Its increaſe was by no means rapid, yet, by the year 1762, it was grown to ſuch a ſize, as to fill his night-cap. Its growth was not attended with the ſlighteſt ſign of redneſs, pain, nor any irregular ſymptom; yet the baſe of the tumor was no leſs than twelve inches in circumference. Mr Le Grand was perſuaded it would be folly to meddle with ſuch a tumor; but the impatience of this gentleman, who could not wear his wig, nor go abroad about his neceſſary duties, was ſuch, that other ſurgeons, contrary to the advice of Mr Le Grand, applied a cauſtic to this tumor. A few days after, the patient was ſeized with convulſions, and on the eighth day he died. The tumor was found to be of a fungous nature, and to have deſtroyed two thirds of both parietal bones."

In children, too, we have examples of the ſame ſufferings, the ſame bloody and ſhocking cataſtrophe, as in the following caſe recorded by Mr Choppart.

"A child being returned from nurſe, of two years of age, quite lively, and without any diſorder, was attacked ſoon after with a continued fever, but recovered. About a month after, the mother, in combing its head, obſerved a ſmall tumor over the right ear, which gradually increaſed, till, in the courſe of five months, it had attained the ſize of a hen's egg, but without diſcoloration or pain. Mr Coutavoz was called, who carried along with him Mr Choppart, then his pupil. Coutavoz thought fit to make an inciſion in the centre of the tumor; only a little black blood flowed out; the child was dreſſed; Mr Choppart viſited in the evening, and found the child eaſy, the dreſſing diſcoloured with a little flux of ſerous and fætid blood; but next day the child died.

"Such an event, unpreceded by pain or other ſymptoms, induced them to examine the head carefully. It was opened by Mr Choppart, who found a fungous tumor of the dura mater, which had made its way through part of the parietal and temporal bones, forming within, a proportioned depreſſion in the ſubſtance of the brain."

But of all the miſadventures of this nature, that which we mention with the greateſt reluctance and pain is, the authenticated impropriety of Heiſter's conduct, in a caſe, too, where the ſigns of danger were leaſt of all equivocal, when we ſhould have expected a man of very inferior talents to form ſenſible and prudent reſolutions.

"A Ruſſian ſoldier, a big and athletic man, of thirty-four years of age, who led a diſſolute life, and had often ſyphilitic infections, which were rather ſup-

preſſed by any medicines he had taken, than entirely extinguiſhed, was obliged, with a vitiated conſtitution, and under every privation of food and reſt, to follow the camp through every viciſſitude of air, ſleeping often uncovered on the damp unwholeſome ground. From theſe cauſes aroſe a tumor on the left ſide of the head, at firſt no bigger than a walnut, but gradually enlarging, ſo as to occupy the whole of the left, and part of the right parietal bone, beyond the ſagittal ſuture. Slight as the pain of this tumor was at firſt, he was ſo alarmed as to look round for aſſiſtance; the military ſurgeons having tried every thing in vain for his relief, and prognoſticated nothing but the moſt fatal iſſue, he came to Helmſtadt, and put himſelf under the care of my patron, friend, and protector, Heiſter. Heiſter, with his uſual ſolicitude, examined this tumor, found it almoſt immoveable, and very hard; and recollecting how often he had cured ſuch tumors with the knife, he declared to the patient, that there was no cure but the knife, neither could he promiſe abſolute relief, ſince he knew not how deep its root might lie, nor in what degree it might have affected the parts beneath the cranium, or perhaps the brain, ſince his ſenſes were at times much diſturbed. Yet, (ſaid the illuſtrious preſident), this is one of thoſe caſes to which the maxim of Celſus may be applied with peculiar propriety; "Melius eſſe experire anceps remedium, quam nullum."

"The patient, impelled by the deſire of being reſtored to health, declared himſelf willing to ſubmit; and his conſtitution being duly prepared by medicine, a cauſtic of alkali and quick-lime, (ſuch as Heiſter often uſed for the opening of all varieties of tumor), was laid upon the part. Three hours had ſcarcely elapſed, when a profuſe hemorrhagy, apparently from cutaneous veſſels, came on, but was ſoon ſuppreſſed by ſpirituous applications, ſo that the patient revived. In the evening of that day, the head being unbound, the plaſters and compreſſes which had circumſcribed the operation of the cauſtic being taken away, and the tumor opened, it was found neceſſary to bind it up again, on account of bleeding. The patient felt ſo little pain, that, emboldened by his eaſy ſtate, he was guilty of the greateſt imprudence. He walked two hours, in chilling weather, in a hall open to every wind, (rudibus tunc temporis ventis), whence he was preſently affected with ſhiverings, with laſſitude, and a creeping feeling and tremulous motion in the limbs, an immediate fever, and a profuſe perſpiration. Next day, at the hour of dreſſing, when the bandages were undone, a new and inflamed ſwelling covered all the left ſide of the forehead, while a bloody ichor flowed from the original tumor. Diſcutient medicines were applied to the former, to the latter turpentines and mell roſarum. But he was

paſt help; for, along with a continual inquietude and toſſing of the body, there was a delirium which the moſt powerful medicines could not appeaſe. Next day, we found our patient lying extended, with his eyes cloſed, his lips livid, and all the ſigns of approaching death. We hardly dared to raiſe him to have the ſore dreſſed; and hardly was this laſt office performed, when his limbs quivered, and he expired *." The diſſection reſembles the others of fungus of the brain.

* "Vir procerioris ſtaturæ atque habitus corporis athletici, potentiſſimi Regis Boruſſiæ militiæ adſcriptus, triginta circiter et quatuor annos habens, non minus ſtrenuus in caſtris Veneris miles, inde etiam conſueta hujus militiæ præmia retulerat, cumque mala inde percepta aliquantum ſopita potius quam penitus e corpore ſublata eſſent, tandem fatalem illum morbum, quo e vivis ſublatus eſt, contraxerat. Siquidem corpore impuris ſuccis ſcatente caſtra ſequi tenebatur, in quibus, præter victus inevitabilem ataxiam, variaſque aeris injurias ac viciſſitudines, ſæpius in locis udis ac paludoſis requieſcere, ſomnumque capere coactus fuit, corpore, et imprimis capite, non ſatis ſemper tecto atque munito. Unde factum, ut tumorem in latere capitis ſiniſtro perciperet, initio vix nucem juglandem magnitudine excedentem, at temporis progreſſu tantam in molem excreſcentem, ut non tantum os bregmatis ſiniſtrum fere totum, ſed et partem oſſis bregmatis dextri, ultra ſuturam ſagittalem occuparet, pugnique magnitudinem æquaret, cujus faciem prout exterius apparebat Fig. I. repreſentare ſtuduimus. Licet æger nullum præter gravativum quendam capitis ſub initium ſentiret dolorem, tamen pejora metuens, medelam creſcentis in dies mali circumſpicere cœpit, cumque medici et chirurgi caſtrenſes, poſt varia incaſſum tentata, infauſta quæque ominarentur, et triſtiſſima eum deſererent prognoſi, Helmſtadium noſtrum, ejuſque decus immortale, Ill. D. Conſiliar. Aul. Heisterum, patronum, hoſpitem, et præceptorem meum ad urnam uſque colendum adibat, ejuſque non tantum conſilium, ſed et auxilium, ſi poſſibile foret, implorabat. Hic re uti ſolet curatius explorata atque perpenſa, dum tumor perquam durus ac immobilis fere erat, atque alios fere ſimiles jam alias ſcalpello curaverat, nullam aliam præter operationem manualem ſupereſſe opem pronuntiavit, nec tamen certum ipſi polliceri poſſe auxilium, dum, quam profunde deſcendat, et quomodo forte cranium imo ipſum cerebrum læſerit, perſpici non poſſet, præſertim cum jam ſæpius ſenſus ſibi haud leviter turbari conqueſtus fuerit, ſed caſum hunc eſſe ejuſmodi, de quibus Celſus ſcripſit, Melius eſſe experiri remedium anceps, quam nullum. Cum itaque ægrotus recuperandæ valetudinis deſiderio ad ſubeundam eam animum confirmaſſet, præparato convenientibus remediis corpore, horis matutinis fruſtulum lapidis cauſtici, quo Ill. D. Heiſterus ſæpius ad omnis generis tumores aperiendos utitur, qui ex calce viva et ſale alcalino paratus erat, ad aperiendum et hunc tumorem imponebatur. Verum enim vero tribus vix elapſis horis largum, ut videbatur ex vaſis cutis ſanguiferis, inſequebatur cruoris profluvium, quod tamen cum linamentis et ſpiritu vini rectificatiſſimo ſuperimpoſitis rurſus compeſceretur, æger bene ſe habebat, et vires admodum conſtabant. Circa veſperam ejuſdem diei, tumore a faſciis, ſpleniis, ac emplaſtro, quod cauſticum ſuis coercebat limitibus, denudato, et quantum circumſtantiæ poſtulabant dilatato, ob hæmorrhagiam iterum mox deligabatur. Vinctura ſatis iterum firmata nihil equidem incommodi ſentiebat, hinc nimis audax in eo haud levem æger admittebat errorem, quod corpus, inſcio et invito ſuo medico, externo frigidiuſculo nimium expoſuerit aeri, et per binas integras horas in area domus, rudibus tunc temporis ventis undique pervia, ſteterit atque ambulaverit; unde factum, ut brevi poſt horrore, ac poſtea membrorum omnium laſſitudine, extremarum partium horripilatione, motuque contremiſcente, poſtque aliquot horas æſtu ac pulſu febrili, ſudore deinde largo per univerſum corpus prorumpente corriperetur, quæ febris, ordinatis licet convenientibus remediis,

This is the awful ſcene in which the ſurgeon is involved, when he puts a raſh hand to ſuch a tumor; this the tragical and bloody cloſe of that ſcene, in which he unwaringly makes himſelf an actor. It was not owing to the "rude winds" that this unhappy perſon died before his time, and in greater torments, but to an ill-founded hope, or weak compliance, on the part of this truly celebrated man, whoſe miſtake will ſerve you, I truſt, as a memorable warning. This leſſon I have repeated in ſtrong, and, I hope, perſuaſive terms. Every new diſaſter muſt ſeem more lamentable, every new offence againſt the rules of good ſenſe and prudence more culpable. You will lament to ſee men of education and ſkill, men charged with the high reſponſibility of public duties; men like Heiſter, (men whoſe years and learning, whoſe ſelf-reſpect and ſelf-command, ſhould forbid them from making experiments even on thoſe who hold the remains of life by the ſhorteſt tenure), imbruing their hands in blood, and performing operations ſo cruel and ſo hopeleſs, as to bring only diſgrace upon our ſcience. Although the ſigns of this kind of danger are far from equivocal, ſuch things have been done from time to time, and the offence is repeated, although Parée, nearly three hundred years ago, deprecated ſuch raſhneſs, and cloſed juſt ſuch a narrative as that which I have juſt recited with theſe memorable words: "J'ai bien volu recitte cette hiſtoire afin d'avertir le jeun chirurgien de ne faire ouverture a la tete en ſemblables tumeurs." So many fatal miſtakes, ſo many patients directly put to death (though really dying) by the hands of the ſurgeon, is ſufficient to give importance, not to this deſcription of tumor only, but to every thing which reſembles it.

Let theſe facts, then, ſtand to you in place of experience. Examine, with a ſcrupulous and jealous preciſion, into the hiſtory of all tumors ſeated on the head. Regard as ſuſpicious thoſe which are connected with venereal affections, with blows, or falls, or concuſſions of the head. Regard as peculiarly dangerous, all tumors of

illum per totum morbi decurſum non deferebat. Poſtridie, cum Ill. D. Heiſterus, comitantibus ipſum compluribus medicinæ ſtudioſis, quibus et ego ſemper interfui, ægrotum renovandæ deligationis cauſa viſitaret, novus apparebat tumor inflammatorius, qui totum os frontis lateris ſiniſtri uſque ad oculi ſiniſtri palpebram occupabat, cui diſcutiendo accommodatum epithema imponebatur; antiquo vero tumori, ex quo remotis faſciis ichor cruentis effluebat, unguentum ex terebinthina et melle roſarum applicabatur, interim vires frangebantur, et cum inquieta corporis jactatione. etiam delirium, quod, non obſtantibus remediis præſtantiſſimis, augebatur, accedebat. Cum ſequenti die accederemus, ægrotum oculis clauſis et labiis lividis moribundo ſimilem deprehendebamus, ut non niſi difficulter ad novam excitari poſſet deligationem. Qua peracta, aliquamdiu poſt, convulſiones utriuſque pedis accedebant, tandemque circa meridiem viribus penitus, fractis miſeram mortalium cum vi a feliciori commutabat. Cadaver poſtea ab Excell. Dom. Præſide diſſectum ſequentia obtulit phænomena," &c.

ſlow growth, of deep pulſation, receding within the cranium, covered with puffy ſcalp, and cauſing, upon being repreſſed, not pain, but ſickneſs, confuſion of head, convulſions, and tremblings of the limbs. When the ſcull is firſt deſtroyed, and the brain, or the internal tumor protrudes, a temporary relief ſometimes enſues. Occaſional eaſe is ſometimes procured by gentle preſſure, and equable ſupport, but the event is inevitably fatal; and frequent ſwoonings, inſenſibility, coma, or quivering of the limbs, an involuntary diſcharge of urine and fœces, delirium, and convulſion, cloſe the ſcene. Touch no ſuch tumor, at the peril of your reputation; for, it is either a caries of the cranium, through which the brain protrudes, or an aneuriſm from without, or a fungus from within, which has deſtroyed the bone *.

* That my reader may be ignorant of none of the authorities nor precedents, and unacquainted with none of the horrid forms or ſymptoms of this diſeaſe, I have been at pains to tranſlate the following caſes:

" A healthy young woman, of eighteen years of age, fell down the ſteps of a cellar from the top to the bottom. She lay ſenſeleſs for an hour; and, upon reviving, was aſtoniſhed to find herſelf laid in bed, having not the ſlighteſt recollection of what had happened. The contuſion of the integuments, merely over the back-part of the parietal bone, was too ſlight to require attention; but, during all that year, ſhe had, from time to time, vomiting and ſickneſs; and for twenty-nine years after, ſhe was afflicted with miſerable pains within the head, aggravated always during the heat of ſummer.

" At the end of the twenty-nine years, in going behind a loaded carriage, it being ſuddenly overturned, ſhe received a blow exactly upon the ſpot injured twenty-nine years ago. She fainted, and lay inſenſible a full quarter of an hour, and they thought they could perceive at this time a dimpling of the bone. Bleeding relieved the pains of the head, and, when they returned from time to time, repeated V. S. procured a temporary relief.

" It was about a year after, on Palm Sunday, there appeared ſuddenly a tumor, the ſize of a ſmall hen's egg. She was at church, but when ſhe returned the moſt portentous ſymptoms began; vomiting, with continual hiccup, with cold extremities, and trembling pulſe, and every ſign of immediate danger.

" The ſurgeon of the inſtitution would have opened the tumor, ſeated ſo expreſsly as this was, on the place where the patient had felt the ſettled pains ſo many years. Yet he did not chooſe to proceed in it without advice. Having called in Mr Mazeux, he was by no means of the ſame opinion. He felt a tumor ſoft, but without fluctuation, and with a pulſation perceivable both to the eye and to the touch. They bled her in the ankle, and deferred till the morrow taking any deciſive ſtep, when they could have the advice of other phyſicians and ſurgeons.

" She paſſed a terrible night, and ſtill the bad ſymptoms continued; ſhe had faintings and cold ſweats, ſo that they deſpaired of her life. She received the laſt ſacrament; and it chanced, that while the offices of religion were performing, ſhe lay on the ſide oppoſite to the tumor; and while ſhe lay in this poſture, the ſymptoms relented, the tumor itſelf diſappeared, and with it all the forerunners of diſſolution. The patient believed herſelf cured by miracle; and, when the profeſſional gentlemen met at the hour of conſultation, in place of a creature on the brink of the grave, as their patient had been deſcribed to them, they found a woman in high ſpirits and

Let us now return to reflect on one indiſputable fact, and it is this: Within the proper ſtructure of the ſcull, the circulation is ſo vigorous, and its ſources of

health, quite gay; and, upon examining the head, they found, in place of the tumor, a hollow, with manifeſt loſs of ſubſtance in the parietal bone, and the circle could be traced, by preſſing in the ſound integuments which covered the hollow, which was of the ſize of a half-crown.

To prevent accidents, and defend the part, they made this woman wear a ſtuffed and quilted bonnet, piqued, and in which a ſmall tin-plate was ſewed over the injured part. But, in ſpite of every precaution, the tumor appeared again from time to time, with all its dangerous train of ſymptoms. But poſture and reſt always prevented danger.

About that period, when the menſes are about to ceaſe, the patient was careful to have herſelf bled alternately in the arm and in the ankle every three months. Finally, at the end of the ninth year from the riſing of the tumor, on the 16th of April 1749, ſhe was attacked with a diarrhœa, ſlight indeed, but which did not ceaſe, when, about three in the morning, the headachs, vomiting, and hiccup, brought her again into extreme danger. At three in the afternoon ſhe fainted, and lay as if dead for three hours, during which ſhe had large involuntary evacuations of fæces. She then recovered her ſenſes, but expired in leſs than an hour after, at the age of fifty-five years.

No one opened her head; it was five years after Mr Robin found means to procure the ſcull. The right parietal bone, at the place where ſhe had received the two blows, was perforated with a hole no leſs than ſix inches in circumference. The inner table, more widely eroded, formed a rough irregular border, while the tumor, corrupting the bone from within outwards and irregularly, ſo that, in the margins of the great hole, there was a ſcore of leſſer perforations, ſmaller and larger, while at other points the bony circle was tranſparent, and ready to burſt out into holes.

My reaſon for inſerting thoſe caſes in foot-notes, my reader will eaſily divine; it is as a reſource in difficult conſultations, and as a full diſplay of ſymptoms.

CASE BY MR MARIGUES.

"A woman about fifty years of age, of a leuco-phlegmatic habit, had been ſubject, for thirty years, to violent epileptic paroxyſms, which was attributed at firſt to a fright. Being attacked with a cattarh, ſhe felt, in every paroxyſm of coughing, a very acute pain under the upper part of the occipital bone, which made her often lay her hand upon the part, as if to give her eaſe. Troches, &c. cured her cough; and it was remarkable, that while this complaint continued, ſhe had not once ſuffered an epileptic attack. About a month after this, ſhe was ſuddenly attacked with epilepſy while ſitting. She inſtantly dropped from her chair, and ſtruck the floor with her head upon that very ſpot where the cough was wont to excite the pain, and from that moment ſhe was never free from ſuffering. About ſix weeks after the fall, ſhe obſerved a ſmall lump, the ſize of a walnut, riſing on that part, and conſulted a ſurgeon about this loup, as ſhe imagined it. He perceived all the ſuſpicious ſigns, he was ſenſible both of the pulſation, ſynchronous with that of the wriſt, and of the tumor being ſurrounded by the circular borders of the occipital bone, through which it projected. He pronounced it a hernia cerebri, and chiefly for this reaſon, that upon preſſing the tumor, it receded within the

blood ſo varied, that the bone by no means depends on any one ſet veſſels for nouriſhment, nor even on that which ſeems the moſt eſſential to its health, the dura mater! The

cranium, and upon raiſing the finger, it roſe again, the pulſation being manifeſt to the eye, as well as to the touch.

" It was a caſe too intereſting to be meddled with without a conſultation. Two other gentlemen viſited along with him. The tumor being repreſſed entirely within the bony circle, a ſwooning came over the patient, and laſted while the preſſure was continued. When the tumor was not puſhed entirely within, there was nothing of this ſwooning; but every time the entire reduction of the tumor was repeated, her ſenſes forſook her, the eyes reeled, and there was a ringing of the ears, and her limbs became powerleſs, the pulſe died away; and it was very remarkable, that the patient, in place of ſuffering by thoſe experiments, was relieved of the dreadful pains in her head, the moment the tumor was preſſed back from the inner ſurface of the bony circle.

" This relief they have attributed to the preſſing back of the tumor, ſo as to prevent it reſting againſt the inner ſurface of the ragged circle of bone. I attribute it to that natural and gentle ſupport which the brain ſhould have from without, and the want of which fills the head with blood, cauſing thoſe convulſions and pains.

" Mr Marigues could not believe that the bone, without any previous ſwelling or inflammation, could be deſtroyed by this blow; nor could he believe the ſoft ſubſtance of the brain capable of forming ſo firm a tumor; he could not therefore admit the idea of a hernia cerebri.

" Whatever was the nature of the tumor, certain it was, that the woman was relieved by gentle and uniform preſſure; (N. B. Theſe are the words of the paper, and it is, indeed, a very remarkable fact); though a violent preſſure diſturbed the functions, a gentle one gave her relief."—Vid. Mem. de Chirurgie, p. 26.

" The patient ſoon wearied of the bandage; the pains returned, cardialgia came on, and they perceived that her memory began to fail. The tumor increaſed in ſize one third, the ſtate of the patient was very afflicting; any bright light, or luminous object, excited the moſt extreme pain. The examination of the tumor being renewed, there was now no difference of opinion among the conſultants, all agreed that the tumor was of a ſchirrous and fungous nature, and that its roots lay within the ſcull; and they ſaid, the only chance of relief was to make a crucial inciſion in the integuments, and apply two or three crowns of the trepan round the opening of the bone to enlarge it, and treat the fungus according to its nature. But this was an operation to which the patient would not conſent.

" A few days after this conſultation, ſhe complained firſt of a pain in her right arm, and then it became powerleſs; next, the lower extremities were ſeized firſt with pain, and then with paralyſis. The pains of the head required that bleedings and anodynes ſhould be again adminiſtered. She lived on till October, when her friends gave her entirely into the hands of the phyſicians, who applied various cataplaſms and fomentations, bliſters under the knees, and cephalic tinctures to the noſtrils. Theſe were almoſt as certain ſigns of approaching death as the ſymptoms themſelves. She died on the 23d of October, about ſeven months after the commencement of that catarrh, with which the more deſperate ſymptoms began.

" On opening the head next day, the integuments and pericranium were ſound, and without the ſmalleſt adheſion to the tumor: which want of adheſion is another conſequence of this diſorganiſing preſſure. The tumor was of a fungous ſubſtance, and ſeemed to be generated in the ſubſtance of the dura mater; its baſe was broader than its projecting part, whence it was in ſome degree ſtrangled by the embracing of the bony circle. The opening in the ſcull, of an oval form, was hardly an inch and a half in its ſhort diameter, or two inches in its longeſt. The roughneſs along the line of the longitudinal ſinus, under the ſagittal ſuture, proved that there

whole of the dura mater may be ſeparated from the internal ſurface of the ſcull, and yet the union be reſtored. We often, upon applying the trepan, perceive that the oppreſſion of the vital powers proceeds from an effuſion of blood under the ſcull, compreſſing the brain. The blood is hooked out with probes, waſhed away with mild injections; diluted by the natural ſecretions, and by the purulent diſcharge from the ſuppurating ſurfaces of the dura mater and ſcull; and the clotted blood being thus diſſolved and diſcharged, the ſurfaces unite again. We are often perſuaded, by the quantity of the extravaſated blood, that it muſt have covered the whole hemiſphere of the brain, up to the ſagittal ſuture. We ſometimes feel the extent of the ſeparation, by introducing the probe; but we ſeldom have ſo clear a conviction, as in the following caſe of the whole extent of the dura mater,—of the whole internal perioſteum of the ſcull being detached. "A young man, of about thirty years of age, was ſtruck repeatedly on the head with a crab-ſtick, and with a loaded whip. Next morning, he was found lying in a ſtate of profound lethargy, and with his right ſide paralyſed, but without the ſlighteſt appearance of fracture, or depreſſion of the ſcull. The marks of the blows being chiefly on the right ſide, that ſide (contrary to a well-eſtabliſhed rule) was firſt trepanned, and the dura mater was found diſengaged to ſuch an extent, as to contain, at leaſt, ſix or ſeven ounces of blood, betwixt it and the ſcull.

"This firſt perforation gave him ſome reſpite, but his friends reſiſted all further attempts to relieve him, till four days had elapſed, when there appeared no longer any hopes of life, and he was left to die among the ſurgeon's hands. Then the left parietal bone was trepanned. The whole hemiſphere of the brain was ſeen to be ſurpriſingly compreſſed by a thick black cake of coagulated blood, of the conſiſtence and colour of currant-jelly. The cake of blood extended actually from the falx, or ſagittal ſuture, to the bottom of the os petroſum; in ſhort, from the vertex to the baſe of the ſcull; and ſeemed to conſiſt of the ſame quantity that was diſcharged from the other ſide, amounting, of courſe, to ſix or ſeven ounces of blood. Although it was not thought prudent to bring away at once the whole maſs, yet, ſo much was diſcharged, that, upon ſpeaking to the patient, he inſtantly looked up, like one awakened from ſleep, named every one, and raiſed the arm which had been paralytic over his head; and much of the coagulum being removed, he recovered apace, ſo as to be able, by the fifteenth, to walk into an adjoining room; but by the

the dura mater had become unnaturally vaſcular, and had begun to aſſume the diſpoſition to diſeaſe. The inward projection of the tumor was lodged in a hollow of the left hemiſphere of the brain."

accidental burſting out of an artery in the ſcalp, he was weakened, the confuſion of head, and even the paralyſis, in ſome degree returned.

" Some days after this, his friends, deſpairing of his life, laid him on a litter, and, without acquainting his ſurgeons, (Mr Hill, and Dr Gilchriſt, of Dumfries), carried him home, a journey of eight miles. The left ſide of the brain ſuppurated five or ſix times, each paroxyſm of inflammation being accompanied with fever, ſtupor, and difficult deglutition, and relieved by an eruption of matter; and it was remarked, that when ſuch ſuppuration formed towards the fore-part of the brain, the candle appeared to the patient double; but when the ſuppuration was backwards, the light appeared to have a halos, or circle, round it; and after each eruption of matter, the candle appeared ſingle and diſtinct. Notwithſtanding theſe occaſional interruptions, he was, in three months, completely cured; became the father of a family, and lived long in perfect health, excepting a ſlight defect of memory, and ſlight convulſive twitches, to which he continued ſubject."

In this moſt intereſting caſe, related by Mr Hill, he had taken every pains to aſcertain the extent of the ſeparation. He found no apology for introducing his probe under the ſcull, on the right ſide, becauſe the blood flowed freely out; but, on the left ſide, his probe, while hooking out the coagulated blood, paſſed from the trepan-hole, in the centre of the parietal, downwards, along the temporal bone, till it was ſtopped by the curvature of the os petroſum, and upwards again by the lambdoidal ſuture, all along the ſagittal ſuture, and over the orbit, along the frontal bone; and it is my perſuaſion, (ſays Mr Hill), that the ſeparation of the dura mater was not leſs extenſive over the right ſide.

What, then, are we to infer from theſe phenomena? Surely this: That, as lacerated ſcalp adheres readily with the external ſurface, the dura mater has an equal aptitude to re-unite with the internal ſurface of the ſcull; and theſe phenomena preſent themſelves daily to the obſervation of the practical ſurgeon. He preſumes, from the ſudden oppreſſion of his patient's ſenſes, and the palſy of his limbs, that the dura mater is ſeparated, by a ſhock, or blow, not ſlightly, ſo as merely to endanger ſuppuration, but to ſuch extent as to cauſe a great effuſion of blood from all its veſſels. He trepans the ſcull, and by the general preſſure, and riſing of the brain, the blood is (as I have generally obſerved it) ſpued up in grumous clots, through the trepan-hole. He puts in his finger,—turns it round,—feels no ſolid reſiſtance, and is conſcious that the dura mater is much depreſſed, and the effuſion of great extent. Sometimes he finds a cake of ſolid and firm coagulum, which bears the preſſure of

the finger. At each dreſſing, he introduces his probe, binds it, and turns it in every direction; by injections of tepid water,—by the help of the probe,—by the purulent ſecretion from the ſurface of the ſcull, and dura mater, the blood is gradually diſcharged, and by every mark it is certain, that the extravaſation has exuded under the whole of one parietal bone, from the forehead to the occiput, and ſometimes from ear to ear. Yet, by the ſecretion of pus, and by the heaving of the brain, the blood is entirely diſcharged, and purged away. The ſcull and dura mater are in a ſtate of ſuppuration by the time they are allowed to approach each other. The dura mater is covered with a velvet-like pile of granulation. The margins of the trepan-hole, and (by inference) the internal ſurface of the ſcull, is covered with a ſimilar pile of granulating fleſh. The dura mater is, by the preſſure of the brain, ſupported in cloſe contact with the ſcull, and the ſurfaces are united, and the trepan-hole cloſed by a proceſs of nature, viſible to the ſurgeon, in every ſtage, and expreſsly reſembling the re-union of ſoft parts.

Thus, we are ſenſible, by daily proofs, that the dura mater, which ſometimes is ſlightly ſeparated, and inſenſibly re-united, (the blood effuſed betwixt the bone and the membrane becoming animaliſed); which ſometimes, after ſuch ſeparation, heals apace, and forms fungi; which moſt frequently of all ſuppurates, and affects the brain; has yet in all caſes a tendency to re-unite with the ſcull, ſo marked and particular, that wherever it does ſuppurate, and prove fatal, it is from one of theſe two cauſes:—either, the effuſion of blood is of ſuch extent, as to hinder the re-union by its interpoſition, as a foreign body, and to oppreſs the brain by its preſſure; or, the bone itſelf has received ſome irreparable injury, has its internal organization deranged by the blow, is no longer alive, nor capable of maintaining its union with living parts.

I know no fitter term to deſignate this affection of the bone, than that of Contusio Cranii, a term calculated to expreſs our perfect belief of the fact, without affecting to define the injury which a bone ſuſtains, when deadened by a blow. But, though we have it in our power to prove on many occaſions, a pure and ſimple contuſion, an affection peculiar to the bone, although it is of importance towards underſtanding all the cervicles of cauſes of danger, that we inveſtigate this particular cauſe ſimply; yet, we have reaſon alſo to believe, that every fatal caſe is of a complicated nature, and that uſually the dura mater is ſeparated, and the integuments injured, when the bone is contuſed; hence the immediate ſuppuration, the external tumor, the ſudden fate of the patient.

We are now called to inveſtigate the nature of this injury, and its conſequences. The phenomena which follow the death of the bone,—the ſlow ſucceſſion, in which the worſt ſymptoms appear,—the inſidious nature of thoſe ſigns which intimate to us that the brain is affected, and which, being overlooked, are ſo invariably fatal. So difficult is it to diſtinguiſh when your patient has fallen into a ſtate of danger, that, as Sterne ſays, when ſpeaking of thoſe glimmerings of intellect, which a careful obſerver may diſcover, among the inhabitants of the northern regions, " You muſt hold your hand over your eyes, and look hard and ſtedfaſtly at the patient, if you would obſerve and anticipate the firſt ſlight ſigns of danger."

OF CONTUSIO CRANII.

The eſſential change produced in the injured part of the cranium by a blow, or contuſion, I have not ventured to define, but ſhall proceed to explain its conſequences, by an analogy, in point of fact the moſt remote, though in philoſophical principle expreſsly the ſame. " Jack Barnes, a fine, active, and ſpirited boy, not yet old enough to enter into ſervice, but able to breed dogs, and take care of horſes; being very adventurous and fearleſs, he had often horſes run away with him, and got many hard knocks, but was never hurt. He was a comely, freſh, and healthy lad, of about fourteen years of age, and had ſixteen brothers and ſiſters, all healthy, the elder lads ſerving in the militia, and the elder girls with the farmers round, when the following accident happened to him:

" He was in harveſt-time driving home a ſingle-horſe cart, and having thrown the halter careleſsly on the horſe's neck, he was afraid, in paſſing quickly through a park-gate, that the wheel would touch, and the cart be overturned. He ſtopped to catch the bridle, loſt his balance, and fell under the cart, the wheel running obliquely over his leg, ſo as to bruiſe the whole length of the tibia, from the ankle to the knee, but without tearing the ſkin. He walked home very lame, complained much during the night. The limb was livid next morning from ecchymoſis; which livid colour changed gradually, as uſually, to green and yellow, and by the

time the colour had vanifhed, *i. e.* in about a week, he recovered from the lamenefs, and was fo entirely well, that he almoft forgot the accident, felt hardly any pain, and continued well for four months.

" At the end of that time, his health went altogether wrong. He was feized with a fever, without any particular tendency, or any obvious caufe. He was obferved by his mother to be dejected, drooping, and fpiritlefs. He had loft his colour and appetite, he had pains in the head, and in all the bones, with feverifh nights, and uneafy dreams; and, on the fourth day, having walked out two miles, to meet his mother, and help her in carrying home a burden of fruit, he came up with her very lame of that leg which had been hurt, and limping with the help of a ftick which he had picked up in his way. His mother got him home with difficulty, in extreme pain. His leg was not at all fwelled before he went to bed; but he lay tortured with pains, which his mother tried to foothe, by rifing from time to time, and rubbing his leg with the palm of her hand. At times he felt relief, but all night long he cried with the extreme pain; and when the morning came, his leg was found greatly fwelled. The fwelling continued increafing for a week; for many nights he was in great anguifh, was exhaufted with fever; his appetite entirely left him, and he was extremely weak.

" The character of this fwelling was very peculiar; it was limited to the line of the tibia, the joints of the knee and ankle being free, or almoft free, from fwelling or pain. This fwelling, which covered all the fhaft of the tibia, formed in one night, but continued increafing for eight days. It was firm, folid, and deep-feated. The fkin was not at all reddened; the pain was in the centre of the leg, in the bone; the tumor continued very hard, firm, and full, for three weeks, and reddened towards the furface only a few days before it burft. During thefe three weeks of pain and fwelling, leeches, poultices, fomentations, &c. were ufed without effect.

" About a month after the firft attack of the pain and fever, the fwelling burft near the ankle, and difcharged about half a pound of matter, with much relief; but a month more elapfed before he could rife from bed, or have his leg carried before him, and laid on a pillow; and when he was raifed out of bed, he was pale and emaciated. He lived on milk and fruits, (his parents made their bread by felling fruit); he had the beft diet thefe poor people could give him; he had daily a little wine too. They had crutches for him, and he began to drag his leg along; and they got him out to the door, and feated him in the fun at midday. From time to time a new attack of fever, with rigors, came on, the pains in

the centre of the limb, in the body of the ſhin-bone, returned. One part of the leg, after another, became red and livid; and the matter, after working within for a fortnight, or three weeks, burſt out, and along with each diſcharge of matter, there came away a portion of the tibia. He picks out each piece of the bone with a ſmall ſilver fruit-knife, which he keeps on purpoſe. Each exfoliation of bone is preceded by a pricking pain, when the exfoliating piece of bone reaches the ſenſible parts of the ſkin; and the phenomena are ſo regular, that he knows well when abſceſs is forming, when a piece of bone is to be diſengaged, and when he is to have relief. He picks each fragment out through its hole, as he would do a thorn from the fleſh. He has picked away forty pieces, ſome of them ſeveral inches long.

"The proceſs is now almoſt complete. Pieces equal to the whole ſhaft of the tibia have been diſcharged through various openings. The ſoft parts ſurrounding the tibia have, during this ſlow exfoliation, formed a new bone; the old bone is diſcharged; the new bone, formed upon its model, and by the ſecretion of its perioſteum, is bigger; of courſe the limb is enlarged, but it is ſound and ſtrong, and in this boy will ſoon be able to bear freely the weight of his body; but as this is a proceſs which is delayed by various obſtacles, we can never ſee when it is completed; it laſts often for years."

Thus you perceive, that it is not in the head only that we aſcribe the death of the bone to a blow. The phenomena I have juſt deſcribed, are thoſe of necroſis; and necroſis (a term applied indifferently by the ancients to the gangrene or death of a part, or of the whole) is juſt the death and diſcharge of bone; and ſince bone is every where the ſame in conſtitution, and internal ſtructure, its death muſt be accompanied with the ſame phenomena in all parts of the body. Theſe ariſe either from the peculiar organization of bone, or from the nature of its connection with the ſurrounding parts. From the peculiar ſtructure of bone, from its firmneſs, and want of ſenſibility, the ſhock which deſtroys it is not ſenſibly felt, its death is not marked by immediate ſymptoms. It may die, and yet continue to preſerve its place, and occupy the very centre of a limb, as a carious and dead tooth occupies its ſocket, without producing abſceſs or pain. From the peculiar connection of the ſoft parts with the ſhaft of a bone, the period of ſeparation is accompanied with pain, abſceſs, fever. The ſeparation is long and tedious, and the ſoft parts, which are ſtill alive, ſecrete new bone, which ſometimes ſimply replaces that which is diſcharged,—ſometimes actually ſurrounds and incloſes the dead bone.

The ſtimulus of the dead excites the action of the living parts. The ſecretion of new bone is proportioned to that which is deſtroyed, and in proportion as the ſhaft of the old bone is weakened by exfoliations, the bone generated by the ſurrounding parts comes to replace it, and is waxing ſtrong, and the boy, (for it is a diſeaſe only of boys, of growing boys, of boys whoſe bones are not yet formed), never for a moment, unleſs it be from pain, or fever, and weakneſs, loſes the uſe of the limb, but walks ſtoutly, while the original ſhaft of the tibia, or thigh-bone, is wholly diſcharged, and replaced by a new formed bone.

Such analogies as theſe are uſeful in delineating the phenomena of contuſed bone. They are neceſſary towards rendering credible one of the moſt certain truths in pathology, viz. That where a bone is deadened by a blow, the ſymptoms are often delayed for months or years; and the phenomena are ſimilar, whether it be a carious tooth,—a necroſing tibia,—or a contuſion of the ſcull. Nor ſhould we be ſurpriſed to ſee this decided death of the bone, or this long train of ſymptoms, ariſe from a bruiſe; or wonder that the internal ſtructure of bone ſhould be thus affected without fracture; for I have ſeen a boy's leg bent under a cart-wheel, and gradually reſtored, or almoſt reſtored, to its natural ſhape, by the natural growth of the bone: and not many months ago, had under my care a young gentleman, who being on horſeback, and riding hard in a dark night, ſtruck the ſhaft of a cart with ſuch violence, that he and his horſe were overturned; he was carried home, lay in bed for eight days in extreme agony; had the whole leg livid, and ſwelled to the ſize of his thigh; and though it unqueſtionably was not broken,—though he kept his bed only eight days, and moved it all the while,—though he ſoon walked into the dining-room, with the help of a ſtick, and all along reſted his weight in ſome degree upon the limb, a ſure proof that it was not broken,—had yet received ſo violent a ſhock, that being very young, and the bones growing, the tibia, at the place where it was ſtruck, about four inches below the knee, was bent, and manifeſtly deformed.

Theſe are the phenomena which I am about to examplify in the ſcull, with this eſſential difference, that the ſimple phenomena of contuſed bone are complicated with affections of the brain. In contuſions of the tibia, or ulna, the pain, the fever, the profuſe ſuppuration, may exhauſt the patient; but it is only when the contuſed bone is deſtined to defend viſcera eſſential to life, that life is endangered.

" A trooper (ſays Petit) was ſtruck by a piſtol-ball, which grazed the middle of the ſternum obliquely,—made a ſmall wound,—laid bare the outer table of the bone, without depreſſing it; and the ball, being thus turned aſide, did not penetrate, but

paſſed out, and was found in the breaſt of his ſhirt. So little was he ſenſible of the injury, that after having a compreſs, dipped in ſpirits, applied to the wound, he mounted again, and rode into the field, where the battle laſted an hour. Upon his return to the camp, his ſurgeon, though he agreed with him that the wound was ſlight, aſſured him that it muſt be dilated, and the bone laid bare. He ſaid, he knew they could cure him by compreſſes ſoaked in arquabuſade water; yet he ſubmitted to confinement, and a ſevere diet, and to the being bled in the arm. Till the fifth day, he was highly pleaſed with his own wiſe councils, but he began then to feel a ſlight difficulty of breathing, and a heavy pain in all the fore-part of the thorax. The hurt part became red, and tumid in all its circumference, and black in the centre. Then he conſented willingly to their doing with him whatever they pleaſed. A large crucial inciſion was made upon the part. He was repeatedly bled; the pains ceaſed, the ſuppuration became healthy. The bone exfoliated, though it required a long while, and he was thus cured *."

The blow, which in this caſe had not depreſſed the outer table, had yet contuſed the bone, ſince the ball could not be thus turned aſide without the bone receiving obliquely the force of the ball. This trooper began to feel that oppreſſion which in ſuch caſes precedes the ſuppuration beneath the ſternum, proceeding like that beneath the cranium, from the death of the ſcull. He was reſcued from the imminent danger of death and ſuffocation †; and this contuſion of the bone, which brings oppreſſion and difficulty of breathing, when the ſternum is injured, brings delirium, coma, and convulſion, in a ſimilar injury of the ſcull.

* Petit.

† That my reader may underſtand this kind of danger, that he may know the manner an abſceſs forms under the ſternum, in conſequence of ſuch contuſion of the bone, I have tranſcribed the following caſe from Petit: "Un ſoldat eut une pareille plaie qui parut légere à ſon chirurgien. Il ne daigna pas y faire une inciſion; il ſe contenta de la panſer avec le digeſtif, il ne paroiſſoit point d'accidens; il ne ſaigna ſon bleſſé qu'une fois ou deux et le laiſſa maitre de ſon régime; la plaie ſuppura. Cependant les chairs covrirent l'os, et ſemblerent ſe diſpoſer à la cicatrice. Le bleſſé quitta ſon hopital, et retourna à ſa troupe, ou peu de jours après il tomba malade d'une fievre, qu'on attribua à ſon mauvais régime. On combattit cette fievre pendant quelques jours ſans faire attention à ſa plaie, qui effectivement à la voir, paroiſſoit n'avoir aucune part a la fievre: on l'envoya à l'hopital de Mons, ou j'etois alors; il me raconta tout ce que je viens de dire: j'examinai ſa plaie; j'y portai la ſonde, et je trouvai l'os découvert: la fiévre étoit mediocre, mais il avoit dans la journée pluſieurs friſſons irréguliers. Depuis quelques jours, il ſentoit une peſanteur ſur la poitrine; quand il buvoit il perdoit haleine, ne pouvoit touſſer ſans doleur, et, après la toux, il etoit quelque temps à alleter; comme quand on a fait une longue courſe. Je ſoupçonnai quelque ſuppuration ſous le ſternum, ou dans le diploé de cet os. J'avertis M. Renault, alors chirurgien-major

There can be no more ſure and unexceptionable proof of contuſion of the ſcull, than that which happens from the grazing of a ball. A muſket-ball communicates no heavy ſhock by which the dura mater may be ſhaken, but is the moſt deſtructive blow to the bone, which being ſtruck obliquely, turns the ball aſide, and receives its whole force, has its internal ſtructure, or living powers deranged, or injured, and blackens ſoon, and exfoliates ſlowly, and ſometimes terminates in a mere caries, but much oftener in a fatal ſuppuration of the dura mater and brain. I need not ſeek to impoſe upon you the authority of reſpected names, to confirm a theory which, before I conclude, ſhall be variouſly and inconteſtibly proved; but remark it rather as a proof of the ingenuity and good ſenſe of Botallus, that he underſtood ſo well the invariable effect of a ball, in deadening the bone. He regards every gunſhot wound of the head, (that where there is merely a bruiſe, as well as that where there is a fracture), as an accident requiring the trepan. He repreſents the ſlighteſt touch of a ball as a kind of contuſion, never to be neglected. He directs, that the piece ſo ſtruck ſhould be cut out with the trepan. He ſays, finally, that having ſeen ſome die, from ſuch ſlight grazing of a ball neglected, he has, invariably, found pus collected under the dura mater, directly under the injured part of the ſcull. "Aliquos etiam ſola *leviſſima illiſione a globulo* facta tum in fronte tum in aliis capitis partibus, præ negligentia tam patientium tam artificum interieſſe vidimus; quibus omnibus, recta ad os ictum pus collectum reperiebatur ſub membranis *."

dudit hopital; il penſa comme moi, il conclut qu'on découvriroit l'os et qu'on appliqueroit le trépan exfoliatif; ce qui fut fait: il en ſortit quelques matieres ſanieuſes; et quoiqu'on eut détruit tout le tiſſu ſpongieux juſqu'à la table, interne on ne crut pas avoir pénétré juſqu'au foyer qu'on ſoupçonna alors être au-delà de l'os dans la duplicature du médiaſtin. Pour s'en aſſurer, on appliqua le perforatif, et, ayant percé l'os, il ſortit du pus; mais l'ouverture n'étant pas ſuffiſante, on y appliqua une couronne de trépan avec beaucoup de precaution; il ſortit un demi-verre de pus; le malade ſe ſentit ſoulagé: enfin les panſemens réguliers et le régime le conduiſirent à une parfaite guériſon en moins d'un mois, et ſans exfoliation: il n'y a pas lieu de douter que le malade fut ſi on ne lui avoit pas fait cette operation.

* Though I am not ſure that Belloſte underſtood perfectly what I have called the contuſion of the cranium, yet it is very plain, that he underſtood well the conſequences, and how to treat the diſorder.

"A ſoldier of the regiment of Guatinois had a wound on the right-ſide of his head with a pretty large bullet, which, grazing upon the moſt convex part of the bone of the ſinciput, had only carried away the common integuments, not hurting the ſcull; but the membrane that inveſted it was ſo bruiſed, that it appeared livid. I know, if time had been given, it would have come to ſuppuration, whereupon the alteration and exfoliation of the bone muſt needs have enſued; to prevent which I tore off with my nails the pericranium; ſo far as it was bruiſed, which was ſomething more than the bigneſs of a ſhilling; and forthwith I ſtruck the uncovered bone as

The ſoldier who is ſtruck obliquely by a muſket-ball, whirls round, and falls. He lies as in a ſwoon. When he revives, he is cold, pale, with a haggard countenance, and wild and confuſed air; but he is ſoon able to get upon his feet. He is carried to a ſafe place; there is found no external wound; the integuments are livid, yet no inexperienced perſon would apprehend any danger; but he continues pale, diſpirited, and languid; in a few days, the part is puffed up, and ſlightly ſwelled. He has then ſickneſs, ſwimming in the head, cold, ſhivering, and nervous tremors; and, upon making inciſion into the part, the bone is found bare, and often diſcoloured; and if, upon the exacerbation of theſe ſymptoms, the trepan is applied, pus iſſues through the trepan-hole, and the patient is thus ſaved. "In the year 1634, at the ſiege of Ratiſbon, (ſays Freitag), a young nobleman from Hall in Saxony, ſerving as a cadet under Col. Bar, was wounded in the top of the head, at the junction of the lambdoidal and ſagittal ſutures, with a muſket-ball, which was found in his hat, and had made a ſlight wound, which his ſurgeon, contrary to all good rules of ſurgery, treated very lightly. Fortunately for this young gentleman, his ſurgeon died of the plague, and he fell into better hands; the ulcer was now broad, the lips tumid and callous, and the bone black to the centre, and completely carious. His preſent attendant, Scholtze, a ſkilful and diligent ſurgeon, was at great pains to deſtroy thoſe ſwelled and callous edges, to enlarge the whole wound, and keep the bone dry, and clear of ſanies: But the blackneſs of the bone yielding neither to inſtruments nor medicines, and ſeeing that a fleſhy excreſcence begun to protrude through the ſutures, he adviſed that I ſhould be called into conſultation; and the patient's habit being prepared, and no milder method preſenting itſelf to my imagination, I adviſed that the cranium ſhould be touched from point to point with a broad cauteriſing iron; by the help of which, aided by the natural powers, I hoped the bone might be looſened. It was in July he was wounded; in May following, the cauteries were applied. The fragment of bone firſt looſened, weighed an ounce and a half, others ſmaller weighed four or five drams. The ſmaller exfoliations, which were ſeparated from day to day, amounted to eighty-two in number, and weighed in all a quarter of a pound. A fleſhy ſubſtance ſprung up

nimbly as I could with the pyramid of the trepan, (*i. e.* the drilled holes in it, the piercer of the trepan), and then covered it with ſome lint, wet with ſpirits of wine. After two days, I took off the dreſſings, and found the bone covered with a lively red," &c. *Belloſte*, p. 85.—"In ſeven days, the bone was quite hidden with new fleſh," &c. p. 86. A ſimilar caſe, in which Belloſte drilled with the piercer where the bone was laid bare merely by a ſabre cut, and with the laſt effects. Vid. p. 87.

from the diploe, and ſurrounding bone, to cloſe the wound, and defend the brain; and in Auguſt he returned to Saxony hale and well, to the amazement of his friends *."

The danger to which this young nobleman had been expoſed, is in itſelf manifeſt; "Almoſt all the great authorities are in favour of trepanning in gun-ſhot wounds of the head, even when there is no fracture; and, indeed, experience ſeems to warrant the rule †." The danger of pus collected under a contuſed cranium will be ſeen in the caſe of the ſoldier-lad Bennet, which I am juſt going to relate to you, though I think it right firſt to ſtate to you, in a few words, one exception from the general rule.

"A ſoldier was hit by a muſket-ball on the right parietal bone. He was neither knocked down, nor apparently injured. Mr De La Combe, who firſt ſaw the patient, found the bone bare, but unhurt, and thought he might ſafely defer applying the trepan. By the twentieth day he found the bone changing colour, and imagined that the increaſing blackneſs indicated an approaching exfoliation, a ſcaling off of the diſeaſed ſurface; but was not a little ſurpriſed when, on the thirty-fifth day,

* "P. P. anno 1634, menſ. Julio in obſidione Ratiſbonenſi juvenis nobilis ex Halinis Saxonicis ſub Colonello de Barr, ex bombarda moſqueta globo plumbeo tactus in vertice, ubi ſutura ſagittalis cum lambdoide concurrit, et concentratur, globus manſit ſub pileo, et primo intuitu reliquit leve vulnus in pericranio, quod negligentius, contra Hippocratis cautelas, a chirurgo per aliquot ſeptimanas tractatum, donec chirurgus peſte extinctus, ſub autumni finem, decurſu vitæ lampada alii traderet, qui vulnus in ulcus ſordidum degeneratum, cum labiis prætumidis et duris, nec non oſſis nigredinem alte et fixe inhærentem vidit. Hic chirurgus Dominus Jacob Scholtz, nulli parcens labori neque ſtudio, omni niſu allaboravit, quo modo labia prædura et tumida tolleret, vulnus manifeſtius redderet, os exſiccaret, ſaniemque copioſiſſimam abſumeret. Verum cum oſſis nigredo neque medicamentis, neque inſtrumentis poſſet tolli, et caro ſuppullulans per ſuturas animadverteretur, in conſilium et me adhibuit, ubi rebus omnibus præmeditatis, et corpore prædiſpoſito, nullum tutius occurrebat remedium, quam ut latiori candenti ferro per intervalla cranium nigrum cauteriſaretur, et ſucceſſive os occipitis mollius redderetur, nec non beneficio ſagacis naturæ, quæ ſæpius prævertit medicum, ſolveretur.

"Hoc menſe Maji factum, ubi natura maximum os ponderis civilis lotonum trium vel unicæ unius ſemis, protrudebat, paulo poſt ſequebatur minus drachmarum quinque; minima oſſa, numero 83, indies excernebantur, uſque ad menſem Auguſti, ubi ſartus tectus, Dei gratia, patrios repetebat Lates, cum omnium ſtupore. Particulæ oſſium fuere numero 85, pondere fere quadrantis libræ, ut in ſchemate tranſmiſſo apparet. Pro propugnaculo, et occipitis firmamento, provida natura carneam maſſam ſupraduxit, quæ exorta eſt ex Hippocrat διπλοῆ, quam ipſe deſcribit l. de vuln. cap. Spongiæ ſimilem, et os ipſum in ſe carunculas multas, humidas habere affirmat his obtentis."

† "Preſque tous les grands praticiens prétendent qu'on doit toujours trépaner dans les playes de tête faites par armes a feu, quoique le crâne ne ſoit pas fracturé; l'expérience ſemble en effet confirmer entiérement leur opinion."

a piece of bone, of the whole ſubſtance of the cranium, ſeparated, and gave iſſue to half a glaſs-full of pure pus, which had formed betwixt the ſcull and dura mater. The patient was dreſſed like one who had been trepanned; the dura mater ſoon cleanſed itſelf, and the opening was quickly filled up, and his cure was accompliſhed in two months *." The danger of ſuch contuſion is manifeſt; the duty of the ſurgeon is direct and plain. Seldom are we to look for ſuch an interpoſition; very rarely does the cranium thus give way, and ſo yield to the burſting of an abſceſs in the ſcull, as to an abſceſs in any other part of the body. I have delivered the caſe of one who eſcaped by miracle, and I ſhall now relate the caſe of one loſt by delay.

" A ſoldier lad, of the name of Bennet, was, on the 4th of June, the King's birthday, ſhot with a piſtol charged only with powder and wadding, and pointed directly at his forehead; the boy who wounded him ſtanding cloſe by him, and firing in a manner over his arm. The wadding hit him on the upper part of the temple, where the parietal joins with the frontal bone. The wound was ſlight; and ſo little was he ſuſpicious of his real condition, that he walked about, unconſcious of any ſerious injury, till the eighth day.

" When he came under our care on the 12th of the month, he had a ſuperficial but ſloughy wound; he ſtill walked about, though in a ſickly and languid ſtate; he had ſlight vertigo, loathing of food, tremblings of the limbs, nauſea, and occaſional rigours. He felt, for the four enſuing days, the benefit of ſlight evacuations, ſevere diet, reſt, and opiates. This interval ſerved as a teſt of his real condition; ſuch complaints might proceed from wound of the ſcalp, or from an affection of the brain; and we were not without hopes of his being ſafe, ſince the pains of his head abated, and the vertigo, ſickneſs, and rigours, almoſt vaniſhed.

" But, on the 17th, his ſituation attracted our particular notice. He had, on that morning, a fit of rigour ſo long and violent, that it denoted a formed abſceſs within the head. On the enſuing days, he vomited the phyſic that was ordered for

* " Un ſoldat reçut un coup de fuſil, qui lui fit une playe ſur le pariétal droit; ce coup ne renverſa point le bleſſé, et ne fut ſuivi d'aucun accident. M. De La Combe, qui viſita la playe, trouva l'os découvert, mais il n'y remarqua aucune léſion; il crut qu'on pouvoit ſe diſpenſer de trépaner ce bleſſé. Le vingtiéme jour il apperçut que l'os devenoit noir, il regarda ce changement comme préparation à l'exfoliation; mais vers le trente-cinquieme il fut ſurpris de celle qui ſe fit, car ce fut une piéce d'os de toute l'épaiſſeur du crâne qui ſe détacha, et qui procura une iſſue à environ un demi-verre de pus aſſez louable, qui étoit placé entre le crâne et la dure-mere. M. De La Combe traita le bleſſé comme s'il eût été trépané. La dure-mere ſe détergea en peu de jours; l'ouverture du crâne ſe remplit aſſez promptement, et la cure fut terminée en deux mois."

him, loathed his food, had a perpetual naufea, with frequent and violent rigours, reftlefs nights, and fearful dreams. But his intellect was unimpaired; he liked to fit upon the fide of his bed, and do all the little offices about his own perfon; yet I thought I could obferve him going round his bed, and doing many things without any decided intention; lifting his clothes or little moveables, and laying them down again, and altogether in a ftate of confufion; though, when feated on his bed, he talked rationally, and gave a clear fuccinct account of the riots of the day in which he was wounded.

"The dangerous fymptoms infenfibly and flowly increafed till the 19th. His fkin was hot, his tongue parched, his pulfe 112 quick, and moderately ftrong; his eye languid, and his countenance dejected; his feeblenefs was every moment increafing; his knees trembled under him; the pains of his head were intolerable, and he now could not endure the light. The previous figns of approaching danger, and his prefent weaknefs, and, moft of all, the ftate of the bone, which was black and carious, called for our immediate interpofition; to me, indeed, it appeared, that the operation had been too long delayed, that it was now too late to fave his life. After a reftlefs and perturbed night, he fubmitted to the operation on the twenty-firft, the feventeenth day from that of the injury.

"The fcalp was laid freely open, fo as to expofe a great extent of black and carious bone, eroded and perforated through its outer table with many holes. In the centre of this contufed bone, the trepan was applied upon the corner of the parietal, where it is joined to the os frontis by the coronal future, which was in part included in the circle. When the bone was perforated, in moft of the circle thick and mature pus iffued through the trepan-hole; and when the piece was entirely removed, and his head laid again upon the pillow, it flowed in great profufion."

This is a period of the cafe, in which it cannot be wrong to ftop, and reflect a moment on the ufeful leffons it is calculated to impref. We have traced a fuperficial injury, with flight and apparently unimportant fymptoms, to the moment of a moft neceffary but unfuccefsful operation; for, little as his intellect was affected, this abfcefs had been penetrating deep into the very fubftance of the brain; and in a few days he expired. We cannot but be ftruck with all the phænomena of contufion, and take an intereft in them, for they are far from being rare; and efpecially, we muft be ftruck with the apparent flightnefs of the injury, a fuperficial wound, unattended, during many days, with either pain or ficknefs, or any fign of danger. We cannot but reflect feriouffly on the critical condition of fuch a patient; the flight

variations which mark the change from health to the moſt dangerous condition; and above all, on the limited period in which it is permitted us to interpoſe ſucceſsfully; how precious the moments of reflection and conſultation ſhould appear; how vigilantly the ſurgeon ſhould watch over his patient, and mark thoſe changes of the countenance, that expreſſion of the eye, that mixed ſtate of irritation and languor, thoſe alternations of delirium and reaſon, thoſe perturbed nights and alarming dreams, which no nurſe nor hired attendant is qualified to report: And it is worthy of notice, that the matter of a ſuppurated dura mater is peculiarly ripe, *i. e.* yellow, viſcid, and tenacious, (which is to be aſcribed, not to the peculiar nature of thoſe ſurfaces, but to the compreſſed ſtate of thoſe parts, and the continual abſorption of the humid fluids), from the moment in which ſuch abſceſs is begun. And let us not forget, that it is but the uncertainty of the ſigns that ſuſpends our reſolutions, for this is an abſceſs which cannot, like any other, burſt outwardly; which, when once begun, penetrates rapidly to the brain, the moſt ſuſceptible, and the moſt important organ; ſo that there is but a moment in which the patient can be ſaved.

To watch the patient, and diſtinguiſh the ſigns, ſo as to interpoſe with deciſion, void of raſhneſs, and ſeize the ſhort interval that is allowed us, is the mark of profeſſional ſkill. Have we not reaſon to believe, that we might have ſaved this young man's life, by interpoſing early? or that a compliance with that precious maxim juſt now recorded, "of looking upon every gun-ſhot wound as a caſe of contuſion," *i. e.* as a caſe where the life of the cranium is deſtroyed, might have prevented the danger?

But to return to our patient: "The night following the operation, he was reſtleſs and agitated, but without delirium; and half an ounce of purulent matter flowed upon the pillow. He was quiet towards morning, and had leſs of the vertigo, ſicknesſ, or pain. This was but a deceitful interval. It was obvious, from the profuſion of matter, that the ulcer had penetrated to the brain; the ſymptoms alſo proclaimed it; and no declaration of an academy of ſurgery, about the unimportance of ſuch abſceſs of the brain, no narrative of hair-breadth eſcapes, will incline a ſurgeon at all acquainted with practice, to look, in ſuch circumſtances, for any thing but death. Before the afternoon he had convulſions, but with his intellect ſtill unaffected. During the night of the twenty-fourth, he was delirious; and, on the morning of the twenty-fifth, was found paralytic of the right ſide; during the night of the twenty ſixth, his urine and fæces flowed continually and inconſciouſly; on the twenty-

ſeventh, he loſt his ſpeech, and had ſtill frequent ſtools. Though he ſpoke a few words on the twenty-ſeventh, be became gradually weaker. The free flow of the matter from within was prevented by a partial protruſion of the brain; and, on the evening of the twenty-eighth of June, he expired.

Diſſection.

" The bone, for a conſiderable ſpace round the perforation made by the head of the trephine, was apparently dead, and its outer table, with ſmall holes, very numerous and irregular. The adheſion of the dura mater was every where perfect, except for a very ſmall ſpace round the trepan-hole. The dura mater itſelf had a duſky brown appearance. There was no abſceſs on its internal ſurface, but many ſmall perforations, and one larger central one; and on the ſurface of this hemiſphere of the brain, immediately under theſe perforations, there were many ſmaller ulcerations, which did not penetrate, and one great and central ulceration, which led to a deep abſceſs in the centre of the brain, directly under the perforation. The edges of all the ulcerations were green and livid; the edges of the abſceſs particularly dark coloured; the reſt of the brain ſeemed ſound, or rather was peculiarly firm, as if from general inflammation."

With this hiſtory before you, and holding in your mind the principles I have already explained, my comments will, I hope, be hardly needful; no diſſection, perhaps, can exhibit a more deciſive picture of the effects of contuſion. The external wound was ſlight, and there was not time for any laceration of the ſcalp to produce caries. There was no general ſhock by which the dura mater could be ſeparated from the ſcull. The exploſion ſo near his head, and the wadding ſo directly hitting the ſcull, had ſo injured its vital powers, that from the moment of receiving the ſhock, it was dead to a conſiderable extent: In but a few days it was black and carious: The dura mater under it was inflamed, though not ſeparated. The ſurface of the brain was ulcerated, and in its centre, under the diſeaſed bone, was formed an abſceſs.

One document, perhaps, ſhould be added to the caſe, viz. the report of the young man's death, as preſented to the magiſtrates, on the occaſion of a judicial inquiry.

" We hereby certify, That John Bennet, common ſoldier in General Ferrier's Brigade, was brought to us on the 11th of June, wounded in the head with the

wadding of a piſtol: From the firſt appearance of the wound, we apprehended that fever and ſuppuration of the brain, which accordingly ſoon manifeſted itſelf, and continued regularly and ſlowly increaſing till the 19th of June, when a conſultation of ſurgeons declared the lad to be in great danger. On the 20th of the month, a ſecond conſultation aſſented to the operation, and agreed that it ſhould be performed next day, if the young man was nothing relieved. On the 21ſt, we found him actually more oppreſſed. The operation was performed, but with little hopes of ſucceſs. Matter was evacuated in ſuch profuſion, as to imply an abſceſs deep within the ſubſtance of the brain. After languiſhing ſix days, he expired. And we have no difficulty in affirming, that his death proceeded from the wound.

" (Signed) ROB. LAWSON.
JOHN BELL."

You are now, Gentlemen, aware of the various aſpects which this kind of caries may aſſume, ſometimes appearing a ſuperficial exfoliation, ſometimes a deeper caries, affecting the whole ſubſtance of the bone, ſometimes, though rarely, the dead part burſting and ſeparating from the living bone; and too often is this contuſion, or death of the bone, followed by fatal ſuppuration within the ſubſtance of the brain. But as yet, I have related no fact, nor advanced any thing, which might lead you to conceive the notion of an injury affecting a part only of the ſyſtem of a bone, of a caries of one only of the tables, and of an abſceſs of the diploe which lies betwixt them. It was what I myſelf never ſuſpected; ſo that the occaſion in which I firſt obſerved it was extremely intereſting.

" A young man, in the prime of life and health, fell from his cart, and the wheel, paſſing obliquely over his head, ſlided upon his ſcull as upon a ſtone. The integuments were torn down to a great extent. There were three large and triangular flaps of ſcalp ſo ingrained with mud and ſand, that the blood, hair, integuments, and ſcull, ſeemed baked into one maſs of filth. The man was profoundly drunk; upon cleaning the flaps of the ſcalp, with the deſign of replacing them, the marks of the cart-wheel upon the ſcull, which was rough and ſcratched, were ſo viſible, as to preclude all rational hopes of re-union; yet the flaps were nicely cleaned, replaced, and held together with ſlight ſtitches.

" That integuments ſo lacerated, and a ſcull ſo plainly injured, ſhould recover, was not to be looked for; but the injured bone might exfoliate, as a mere caries,

and the violence, beſides, was of a peculiar kind, there was no fracture; the patient had received no blow by which the bone might be contuſed throughout; the injury was apparent on the ſurface only, and was probably limited to the external table of the ſcull. The external table might exfoliate, but it was infinitely more probable, that the caries ſhould penetrate and affect the dura mater; and it was our duty to watch for ſigns of danger; and yet to truſt to nature ſo long as the injury ſeemed local, ſo long as it was poſſible that it might exfoliate ſuperficially, and as a mere caries.

" The man, more aſtoniſhed than hurt, was no ſooner reſtored from his brutal ſtate of intoxication, than he appeared to be in perfect health; there were no ſhiverings, no fever, no confuſion of head during the day, nor delirium during the night; much as we were perſuaded of his danger, it was only danger to be apprehended, no ſymptom as yet announced it. The ſuppuration from the integuments in ſuch a caſe is profuſe and foul; and, while ſuch a lacerated wound, ſo ingrained with filth, is cleanſing and granulating, it viſibly mends, and the ſurgeon is too apt to indulge hopes, which are never to be realiſed. In this caſe, the integuments firſt thickened, as they always do, by inflammation; were next waſted by ſuppuration, and remaining ſtill inſulated, the edges became livid, and ſloughed off, while the ſcull blackened more extenſively; a ſlight fever was inſeparable from ſuch a ſtate; his face was full, and his eye heavy and languid; yet that was not much to alarm us; but he ſickened; on the thirteenth, he was reported delirious during the night. We could no longer be reſponſible for delay, and he was trepanned; and circumſtances of the moſt ſingular nature, which I wrote down, (as always I have done by the bed-ſide of my patient), perſuaded me on the inſtant that this was as truly an abſceſs in the ſubſtance, in the cancellated part of the bone, as even a boil was an abſceſs of the cellular ſubſtance of the ſkin."

Remarks in the time of operation, and after it.

" The integuments, by retraction, by ſuppuration, and, moſt of all, by the gangrene or ſloughing of the edges and angles of the ſeveral flaps, were ſo waſted as to have left an extent of naked bone, as broad almoſt as the palm of the hand. The bone, dry and ſcabrous, was black in two places. The perforation was made near the centre of the parietal bone, on a point of bone black as a coal. In perforating the outer table of the ſcull, not the ſlighteſt tint of blood appeared; it ſeemed dry through all its ſubſtance; the ſaw-duſt was black at firſt, and became white in the

progreſs of ſawing, and as dry as hair-powder; it was eaſily blown away, and the working of the ſaw was like the cutting of button-moulds from a piece of horn. The whole ſcull was extremely thick; the ſawing, which was deliberately performed, was of courſe extremely ſlow; at laſt thick and viſcid pus ſpouted up round the inſtrument, and I had no doubt, (although I had before affirmed the dura mater and brain to be ſtill unaffected), that there was an abſceſs; that the operation was fortunate, and might eventually ſave the patient's life. But the moſt accurate probing of the circle with the point of a quill did not diſcover to us even a ſingle point in which the perforation was complete. The inner table, to our utter amazement, was perfectly entire; and there appeared, for a moment, no other rational explanation of this phenomenon, than that the inner table muſt have been fractured, permitting the pus to exude through ſome oblique paſſage, from an abſceſs of the dura mater, to the cancelli betwixt the tables of the ſcull.

" The crown of the trepan was again applied, and, under the impreſſion of there being an abſceſs betwixt the ſcull and dura mater, it was turned boldly and freely, without fear of wounding that membrane, when ſuddenly there iſſued through the trepan-hole much blood; and it was feared, that ſome ill accident had happened, in ſhort, that the dura mater was wounded. But, upon probing with the quill, the inner table was found ſtill entire; there was every reaſon for ſawing ſlowly and cautiouſly; and it was, accordingly, very long of being cut through. During all this ſtage of the operation, the blood flowed profuſely; and, when the circle of bone was at laſt taken out, the blood and matter ceaſed to flow. The dura mater was ſeen white and clean, firmly attached to the edges of the bony circle, and no where ſuppurated; and every circumſtance of the operation inclined me to examine the trepanned circle with particular accuracy.

" The circle of bone ſawed out with the trephine was, except one, the thickeſt I had ever ſeen. The external ſurface was perfectly black; the hole where the centre-tooth of the trepan pierced this carious table, and all the ſides of the ſame table, were of a dead, white, or aſh colour; the cancelli were gaping and irregular, yet without any very particular appearance. But the inner table was red in its ſubſtance, and bloody in its edges.

" The ſtate of the dura mater was, during the cure, the ſubject of my moſt careful inveſtigation. There was, I am well aſſured, no abſceſs; its ſurface changed, and it went through the proceſs of granulating without more matter than that which that proceſs implies, and ſuch as the expoſed ſurface alone might produce. Theſe

deſcriptions, taken carefully from my caſe-book, require no comment. This at leaſt is ſure, that the inner table may remain ſound, and full of blood, while the external table and cancelli are contuſed and dead; and I have no doubt, that this man was ſaved from moſt imminent danger. Every ſuch caries ſhould be trepanned; very ſlight indeed is the chance of ſuch an injury being partial at the firſt, or continuing ſo; ſtill leſs likely is it, that after penetrating juſt to the dura mater, it ſhould be ſeparated, as in a caſe I have formerly related to you, by an effort of nature."

But of all the examples of contuſio cranii, that produced by the grazing of an oblique ball, or the obtuſe blow of a ball, whoſe force is ſpent, ſeems to me the moſt ſimple; no other kind of violence ſo effectually deadens a bone, nor ſo certainly draws after it fatal conſequences. "A Lieutenant of the regiment of Haynault (ſays Mr Martiniere) was wounded with a ſpent ball a little above the right frontal ſinus. The ſurgeon who firſt ſaw him thought it right to make a crucial inciſion, to diſplay the ſtate of the bone, which he found free from fracture or fiſſure. The ball had ſomewhat ſtunned the patient, but bleeding had relieved this ſymptom; and there ſeemed to be nothing to do but take care of the wound. But, at the end of three weeks, the patient fell into a lethargy, with a hard and oppreſſed pulſe. When Meſſ. Petit and Martiniere were called, they found his caſe deſperate; yet they felt it to be their duty to apply the trepan. The perforation gave vent to a great profuſion of pus; but, by being late performed, it was of no avail *."

It is my earneſt wiſh, that you ſhould learn on this, as in all queſtions of practice, to draw your own concluſions from fair deſcription and plain facts. From thoſe which I have now laid before you, you will have, I believe, true conceptions of the ſtate of the bone, of its alteration of ſtructure, of its various modes of ex-

* "Un Lieutenant du regiment de Haynault fut bleſſé par une bale morte, qui lui fit une playe un peu au-deſſus du ſinus frontal droit. Le chirurgien qui le vit d'abord, jugea à propos d'y faire une inciſion cruciale pour examiner l'os; il ne trouva point de fracture; le coup avoit un peu étourdi le bleſſé; mais les ſaignées diſſipérent cet accident; on s'en tint par conſéquent à la cure de la playe. Au bout de trois ſemaines le malade tomba dans un aſſoupiſſement léthargique; ſon pouls devint enfoncé et dur. M. Petit le fils et M. de la Martiniere, chirurgiens-majors de l'armée, y furent mandés; ils trouverent le malade ſans eſpérance; cependant l'opération du trépan leur parut indiquée de façon qu'il ſe crurent obligés d'y avoir recours. Cette opération donna iſſue à beaucoup de pus qui ſe trouva ſous le crâne; mais parce qu'elle ne fut faite qu'à la derniere extrêmité, elle fut inutile au bleſſé. Ces exemples nous font aſſez appercevoir que les coups d'armes à feu ne doivent pas être confondus avec les autres bleſſures de la tête, ou les conjectures que l'on peut tirer de l'inſtrument qui a frappé, et de la force apparente du coup ne décident rien."

foliating, and of the difmal confequences which often enfue. But, in addition to thofe plain facts, I take a pleafure in laying before you two defcriptions, the one by Deffault, the other by Le Dran, which approach to a demonftration almoft of the contufed ftate of the bone; and I alfo will indulge myfelf, (and perhaps gratify you), by proving, that the ancients have left many evidences in their writings, and many proofs, even in the very terms they ufe, that they were not ignorant of this ftate of the bone, nor of its concomitant dangers.

" A man (fays Deffault) of five and thirty years of age, was ftruck with a bludgeon over the head; a blow which ftunned him for a few minutes, but did not knock him down. He had himfelf bled in the foot, drank of a vulnerary potion, believed himfelf cured, and continued well for a month. Then he fickened, loft his appetite, his tongue took on a yellow fcurf, fhiverings came on, he fell into coma, and died on the fixth day.

" On diffection, (fays Deffault), we found not the flighteft outward mark of injury; the fcalp was found, the external table of the fcull had its natural colour, but the internal table was blackened through the whole extent of the parietal bone. The dura mater lining this part of the fcull was of a colour ftill darker; yet it adhered as formerly to this furface, as to that of the uninjured part of the fcull, while all the lower furface of the dura mater was coated with an afh-coloured vifcid pus, which not only covered the furface, and entered among the convolutions of the brain, but tainted its fubftance to the depth of feveral lives. The reft of the brain was found and natural *."

There cannot be imagined a more perfect example, or fhorter defcription of contufion, pure and uncomplicated. The integuments ftill entire, without even the flighteft tumor, fo that the bone had not fuffered by any difeafe from without; the dura mater ftill adhering, fo that, unlefs the bone had been deadened by the blow, it might have preferved its circulation from within; the bone alone had been injured by the blow, fo as to af-

* " Voici ce que j'obfervai, à l'ouverture du cadavre. Il n'exiftoit fur l'extérieur de la tête aucune apparence de contufion; les tégumens étoient très-fains; la table externe de la voute du crâne avoit fa couleur naturelle; mais la table interne étoit noire dans toute l'éntendue de la foffe pariétale droite. On voyoit la même couleur fur la portion correfpondante de la dure-mere, et même un peu au-delà; d'ailleurs cette membrane avoit, de ce coté, les mêmes adhérences avec le crâne, que du coté oppofé. Il y avoit audeffous de la dure-mere, et dans l'endroit que j'ai indiqué, une légere couche d'un pus épais et grisâtre, qui s'étendoit jufque dans les anfractuofités, et qui avoit macéré la pie-mere et la portion correfpondante du cerveau, à quelques lignes de profondeur. Le refte de ce vifcere étoit dans fon état naturel."

fect, in its turn, the dura mater, which alone was inflamed and purulent, in consequence of the death of those parts. But yet, an accidental description of Le Dran pleases me still more. " A man, who had been wounded with a sword, continued well, and walking about in the hall of the hospital, till the seventeenth day, in the evening of which day he was suddenly seized with delirium and fever, and soon after died. The first table of the scull was divided by the sword, the second was only contused; betwixt the pericranium and scull was a coat of a sort of purulent mucilage; the same purulent mucus was lodged betwixt the cranium and dura mater, and also betwixt the dura mater and pia mater.

" When I examined the cranium, (says Le Dran), I discovered the cause of this disorder. There was no fracture; but *a contusion, about the bigness of a crown, was visible* in the diploe, discoverable by a large black spot, which was of an ellyptical figure, in a line with the cut in the external table, and surrounded by several black rays. I have preserved that piece of bone; and, although it is dry, and I have had it for some time, the black spot still appears upon the internal table, and not upon the external; but it is more conspicuous against the light *."

Is it not most natural, that the blow which shakes the dura mater, and separates it from the scull, which bursts its arteries, and occasions effusion of blood, should also burst arteries, and occasion effusions of blood within the substance of the bone? The above description ascertains it, and the expressions used by the best of the older surgeons assure us of its having been long a matter of observation. The true and lively manner in which Fallopius describes the mark for discovering contusion, and claims it as his own, will strike you very much. He was spirited up to write in this kind of language, by a mistake of Vidus Vidius, a clumsy commentator, who does, indeed, talk very coolly about the blackening of the bone. " Since (says Fallopius) the contusion of the bone is very dangerous, how, say the commentators, shall it be known? Not by the senses, not immediately after the fall, not till the third or fourth day. It is to be known, (says Vidius), by making an incision,—by the blackness of the bone. God have mercy on those, whose physicians think fit to wait

* *Le Dran*, p. 93. I am sorry to have, not the original, but the translation only of this book; and such a translation, the lowest journeyman in the trade might well hold up his hands at it. The translator very gravely informs us, p. 76. that " ancient authors have *defended* the re-union of parts which are contused;" *i. e.* have forbidden the re-union of bruised parts; an anecdote well deserving a place in D. Israeli's curiosities of literature. It is just the mistake introduced, by a fellow-labourer at translation, into the service of the church, who, in translating the liturgy, renders, " Dieu defend l'adultere," " God defends adultery."

the blackening of the bone. Why, bones the moſt cruelly mangled and depreſſed, contuſed, as they certainly muſt be, do not blacken, if treated with prudence and care; often, indeed, in wounds, the bone blackens, but that is through length of time; how, then, ſhall we preſently know, whether a bone is contuſed? I have not heard nor read in any writer the ſecret marks of contuſion; but they are as follows:

"Look to your nails; remark their freſh and lively colour, white, tempered with red, but ſpotted with ſpecks of a deader white. Thoſe ſpots have been named by the Greeks nebulæ, by us mendacia; and exactly ſuch ſpots appear in contuſed bone, red at firſt, but afterwards of this dead white; for the bone changes colour in its various ſtates of life, death, and putridity. The colour of a living bone is white, delicately tinged with red; that of a dead bone, unmixed white; that of a putrid or carious bone, livid or black. This is the cauſe why, when you firſt lay open a bone, you find it of a reddiſh white colour; white, becauſe its earth is of the pureſt; and mixed with red, becauſe it contains the finer part of the blood, a ſort of ſanguineous vapour, which, as it is from the blood, is red. And this is my proof, and you may witneſs it, that when I ſcrape the cranium, I have ſcarcely penetrated the ſurface, when blood begins to flow; and ſo it is, indeed, in every bone.

"This being eſtabliſhed, it follows, that during the firſt ſtage, *i. e.* during the two firſt days of a contuſion, that part which is marked with theſe ſpecks of blood is ſtill alive. But the blood exhales by the third day; for then the contuſed parts are divorced, though without any viſible ſeparation from the living bone. They no longer hold a living connection with it, nor are nouriſhed by a circulation of humours; hence the redneſs ceaſes, and the ſpots and ſpecks become white, which is truly the colour of a dead bone. Thus do I recogniſe contuſion by the change of colour; I recogniſe it alſo by its blackneſs; but this is a mark too deciſive, and too certainly fatal, to be waited for *."

* "Mentiuntur, quum dicunt in detectione, non adeſſe periculum. Dicit quis, nonne majus eſt periculum, ſi adeſt contuſio? quomodo cognoſcitur? Inquit Hippocrates quod non cognoſcitur ſenſu, an adſit contuſio, ſtatim poſt vulnerationem; cognoſcitur tamen ſucceſſu temporis, et hoc non negavit Hippocrates; quoniam tertia et præcipue quarta die apparet; quomodo? reſpondet Vidius, per nigredinem oſſis.

"Dii boni! male ageretur cum ægrotantibus, ſi expectaremus nigredinem oſſis, præſertim cum oſſa educta a propria ſede, et contuſa, ſi bene tractantur, nunquam nigra fiant; non nego ego, quod in vulneribus aliquot os contuſum nigreſcat in exteriori ſuperficie, et raro in interna, ſed poſt longum tempus. Sed quomodo cognoſce-

That the ancients, the Arabians at leaſt, were no ſtrangers even to that ſuppuration betwixt the tables of the ſcull, which I have juſt deſcribed, is manifeſt from the following paſſage from the works of Heliodorus, as tranſcribed by Oribaſius.

" *Of Abſceſs under the Bone.*

" The bone which, independent of fracture, is ſuppoſed to have pus under it, or *matter collected in the ſcull itſelf, in the cancelli betwixt the layers of the bone*, ſhould be trepanned, and entirely cut away. If, in trepanning, the pus riſes through the trepan-hole, it is to be ſtopped with lint; for the pus being thus confined, the perforation of the bone is more ſenſibly felt, while the matter is confined by the inſtrument. But, when the collection of pus is truly under the cranium, betwixt the bone and dura mater, the membrane having ſeparated from the ſcull, we are to proceed, as in the caſe already mentioned of a fiſſure, with ſuppuration of the dura mater *."

mus? Ego non obſervavi, nec vidi ſcriptum ab alio. Conſpiciatis ungues veſtros; vos reperietis unguem eſſe coloris albi, ſubrubri, videbitis in eis maculas albas; hujuſmodi maculæ a Græcis nebulæ, a noſtris mendacia vocantur; qualis apparet nubecula in ungue, talis in oſſe contuſo nubecula hinc inde alba apparet; nam triplicem colorem habemus oſſis putridi, viventis, et mortui; putridi eſt niger, aut livens; mortui eſt candidus, viventis in homine vivente non affecto, eſt color albus, cum levi quadam rubedine admixta. Hoc ſtante; cum vos ſtatim detegetis aliquod os, reperietis ipſum album cum rubore; eſt album, quia eſt maxime terreſtre, et optime concoctum; ſi eſſet uſtum et ſuffocatum; nigrum eſſet; terra optime cocta fit alba. Cur habet ruborem? quia in eo continentur partes tenuiſſimæ ſanguinis, vapor, ſcilicet ſanguineus, qui cum fit a ſanguine, ruber eſt; probabo, quando abradam cranium alicujus, vix abradam portiunculam oſſis, et vos videbitis ſanguinem manantem, ita fit in omni oſſe. Hoc conſtituto, ſi contunditur os, in primo termino contuſionis, vel poſt contuſionem, per duos dies, vel tres, adhuc vivit pars illa continens ſanguinem; poſt triplicem diem exhalat ſanguis, qui continetur in partibus contuſis; cum partes contuſæ, ſint liberatæ ab integro oſſe ſano; quamvis latentis ſeparatione; ideo non habent communicationem alimenti; et hinc eſt, quod ceſſat rubedo, et apparent maculæ, punctim albiſſimæ; qualis eſt color oſſis mortui; quia illa officula mortua ſunt. Ego igitur primis diebus, cognoſco contuſionem, cognoſco etiam ex nigredine, ſed ipſa non eſt expectanda.—*Fallop.*

* XVI. LXIV. *De Oſſibus quibus Pus ſuleſt.*

" Quod dicitur ſubtus purulentum os eſſe ſine fractura, humore in ipſa calvaria collecto *in interſtitio duplicis oſſis*, terebrandum totum id quod abſceſſit, et excidendum eſt. In terebrando ſi humor e foraminibus fertur, retardandus is eſt carptis linamentis objectis, humore enim repreſſo, oſſis perforatio ſenſu percipitur, dum pus a terebra urgetur. Ubi vero collectio ſub calvaria, et in inter os et membranam cerebri ſit, ipſa ab oſſe abſcedente, ea facienda ſunt, quæ de fiſſuris præcepimus cum abſceſſione membranæ incidentibus."—*Orib. de Fract ex Heliod.* XVII. xix ——And he adds in another paſſage, " Cruor quoque interdum per punctum locum *e cavernulis, ab interſtitio duplicis oſſis ferri conſuevit*, doloreſque prioribus graviores inſequentur. Ubi calvariæ os vel majorem partem, vel per totum caries perruperit," &c. Hippocrates had a perfect conception of the effects of contusion upon a bone, and deſcribes moſt minutely, not merely the phenomena of caries and exfoliation, but the cauſe

This extravaſation of blood betwixt the tables of the ſcull,—this contuſion deranging even the intimate ſtructure of the bone,—the ancients were familiarly acquainted with. They called it "Sanguis ſubterlabens," which I know not how otherwiſe to tranſpoſe into the language of modern pathology, than by calling it "extravaſated blood." They diſtinguiſhed extravaſation under the ſcull, from extravaſation in the ſubſtance of the bone. "The collection of extravaſated blood (ſays Archigenes) betwixt the two lamellæ of the bone, reſembles the ſpots under the nails; but the blood being quickly converted into pus, brings on a lividity of the bone. The cure of this by perſpiration, and by the exudation of the blood, is eaſy, but the cure of that which is extravaſated upon the dura mater, is every way difficult *."

The fact has never been more accurately deſcribed by moderns; and, in point of philoſophy, they have manifeſtly declined; for the ſuppuration under the ſcull has been aſcribed, in modern times, to the putreſcence of the many ligamentous fibres which connect it with the dura mater; and the death of the ſcull itſelf, to the utter extinction of the radical heat and moiſture of the bone. "Dura menix (ſays Magatus) cum pluribus ligamentis cum cranio connectitur, fieri non poteſt quin ligamenta quæ cum mortuo oſſe copulatur putreſcant, atque ſupra membranam ipſam colliguntur ichores pravi, &c. Conſtipantur calvariæ pori, prohibeturque eventatio, *et labefactatur rationis calor.*" And Wiſeman, very proudly, repeats this profound piece of philoſophy; after deſcribing an exfoliation of the whole thickneſs of the ſcull, he adds, "If you will aſk the reaſon of this, I muſt tell you, that, according to our judgements, it was the effect of the *contuſion*, of which, indeed, there appeared no marks. Yet, without doubt, by the force of the blow, *the heat was extinguiſhed in the bone, and as a dead bone it ſeparated* †." My purpoſe, then, is accompliſhed, if by facts and circumſtances I have been able to convey to you a juſt conception of the ſtate of the bone, which is produced by a blow, and has been

alſo. He ſays, "*Ubi exſangue redditum fuerit, os tunc abſcedit.*" And of an exfoliating bone he ſays, "Ab alio oſſe *ſanguinem* in ſe adhuc habente ac vivente abſcedet; *quia redditum exſangue et ſiccum, ab eo quod ſanguinem habet vivitque, valde abſcedit.*"—*Hippocrates.*

* "Concurſio ſanguinis ſubterlabentis, quæ *quidem ſub ſuperiore duplicis oſſis parte fit*, ut ſub unguibus manifeſta eſt, ſanguis autem tempore in pus converſum os livens oſtendit. Sed hanc et cognoſcere, et curare perforando duntaxat, atque humore emanante, facilius eſt. Quæ vero ſuper cerebri membranam fit, utraque ratione difficilis eſt."—XXIII. LXXI. *E Libris Archigenſis de Sanguine Subtercurrente.*—He means, in this paſſage, to ſay, that it is eaſy, by perforating with a point the carious part of the ſcull, to procure exfoliation, the matter being betwixt the tables. But the danger is great, when the ſuppuration is not in the ſubſtance of the ſcull, but under the dura mater.

† Wiſeman, p. 142.

known and remarked in all ages, "ſaving ſome variations in the phraſe," from the days of Hippocrates, to modern times. The ancients, you will perceive, formed a practical inference, which, moſt unhappily, has been long ſince forgotten. For they, from the ſtate of the bone, inferred the dangerous condition of the brain, and from thence that juſt and moſt important rule, That we ſhould, in all caſes of contuſion, operate early, and judge of contuſion by other marks than its blackneſs. "Dii boni! male ageretur cum ægrotantibus, ſi expectemus nigredinem oſſis."

Now, you might feel as if I had ſtated phenomena, and rules of practice, inconſiſtent with each other. I have delivered it to you as a rule equally ſupported by authority and reaſon, "That contuſion is never to be neglected; that, if you wait for the blackening of the bone, or other deciſive ſymptoms, your patient will die." And yet, from the analogy I firſt uſed in exemplifying the phenomena of contuſion, by comparing the contuſio cranii with the necroſis of a boy's tibia, or the unoffending and ſlow deſtruction of a carious tooth, I muſt have prepared you to hear of ſymptoms protracted for a great length of time; and, (dangerous as the proximity of the brain and its membranes is), you muſt have been led to believe, that ſometimes the brain might eſcape. So indeed it is; the ſymptoms ariſing from contuſio cranii are often protracted to a period of time, which no analogy, nor any thing but the plain unequivocal fact, could induce you to believe. And I proceed to narrate this fact to you with various concomitant circumſtances, in order to complete my deſcription of the contuſed cranium.

It cannot be but that a carious bone may, in any part of the body, remain inſulated, ſurrounded by a fiſtulous and callous ſore, but no where is this condition attended with ſuch imminent peril and danger, as in caries of the ſcull. It is not by the period of the fortieth, or even of the hundredth day, or in any limited term, that we are, in wounds of the head, to judge of our patient's danger; for, as a corrupt and dead tooth may long hold its place (as indeed a gold tooth, or a tooth ſcrewed upon a ſtump will) in its ſocket, exciting, for a long courſe of years, only occaſional pain, and ſuppuration, ſo will a dead bone lie long quieſcent and harmleſs; and yet, when that final ſuppuration, which detaches a piece of ſcull, does come on, it is but too natural, (however long the ſymptoms may have been delayed), that it ſhould endanger the brain. That a contuſed and deadened part of the ſcull ſhould remain thus unoffending, and unaccompanied with ſymptoms, is nothing but what our philoſophy can eaſily explain; it implies no more than that the dura mater, if it eſcape the firſt ſhock, may ſecede ſo ſlowly from the deadened bone, as to leſſen the danger; in ſhort, that a contuſion of the ſcull may terminate in mere ca-

ries. Sometimes the corrupted bone is merely rough, and bare, as is felt by the probe, upon cutting into a puffy tumor. Sometimes it is ſurrounded with tumid integuments, and fiſtulous openings, diſcharging a thin and browniſh ichor. Sometimes it only excites occaſional tumidity, and partial ſuppurations, as in the boy's necroſing tibia. Sometimes the dead bone, divorced entirely from the ſound, burſts away, as in the caſe I have related of the drunken woman. Sometimes it is nearly dry, and bloodleſs, as in a caſe which I ſhall preſently relate to you. Sometimes the ſcalp remains entire, while ulceration imperceptibly deſtroys the bone, and it is ſo entirely abſorbed, as to leave an open circular ſpace. Sometimes, as in a caſe I ſhall ſoon relate to you, the whole cranium is diſcharged. In ſhort, that contuſion which uſually affects the brain, and proves fatal on the fifteenth or twentieth day, terminates ſometimes in mere caries of the ſcull; the patient being, during all the period, in perpetual danger, yet never ill.

It has been the opinion of the profeſſion, ever ſince the days of Hippocrates, and by univerſal aſſent, eſtabliſhed as law, that during forty days from the time of any injury of the head, a man is in danger; that, if he die within that period, it is imputable to the wound; that, till that period have elapſed, the perſon cannot be acquitted who gave the blow. By the paſſages which I now recite to you *, (a comment on Hippocrates, by the very learned Magatus), you will perceive, that from the *ſeventh to the fourteenth day*, has been in all times acknowledged as the uſual period of fever and danger; while yet a patient was not accounted ſafe, and out of

* "Verum tamen non eſt pronuntianda certa ſalus, licet enim decima-quarta communiter ſit terminus inflammationis, et morborum acutorum, donec tamen pertranſeat dies quadrageſima, res non eſt in tuto, ut crebra experientia demonſtravit, quandoque enim cæca rimula in oſſe exiſtens, aut occulta contuſio, tarde admodum eſt in cauſa corruptionis oſſis, tardeque defert affectionem ad ſubjectam membranam: quandoque et ob aliquod accidens aliqua puris portio concluditur in diſſecta membrana, aut cerebro, quæ etiamſi veluti guttula ſit, paulatim tamen in continentes agit partes, et progreſſu temporis corrumpit, immo paulatim augetur, tum quia ab eodem loco, ex quo ipſa prodiit, aliquid continuo reſudat, tum etiam quia natura rem moleſtantem ſentiens, atque in ea expellanda omnem conatum adhibens, eo conſuevit ſpiritum una cum ſanguine exprimere; non mirum igitur, ſi quandoque pereant, qui tuti eſſe videbantur; immo aliqui volunt, ubi præſertim detecta eſt membrana, ægrum extra aleam non eſſe ante centeſimam. Sed quoniam rariſſime contingit, ut quis poſt quadrageſimam periclitetur, neque alia de cauſa, quam ob pravam victus rationem, vel aliquam cauſam fortuitam, quæ faciat, ut ad partem vulneratam, quæ a vulnere non modicam imbecillitatem contraxit, humores confluant, et generetur inflammatio, et putredo, vel refrigerando debilem adhuc partis calorem obruat, poſſumus pronunciare certam ſalutem, ſi tamen ægrotantes per longum temporis ſpatium idoneam ſervent victus rationem, et injurias externas devitent, ne occaſione imbecillitatis partis aliquod accedat incommodi. Itaque principium ſpei eſt in emanatione boni puris intra ſeptimam, et quo citius emanat, eo melius cenſendum eſt, ſed confirmatur in decima-quarta, ubi per totum id tempus, nec febris, nec aliud ſymptoma acceſſerit."—*Magatus*, p. 202.

danger, *till the fortieth had elapſed.* If, after this critical period had paſſed over, a man fell into danger, it was lawful, it was merciful, to impute his danger to ſome error in exerciſe, or diet, or the paſſions of the mind, or thoſe other moſt natural things, which are wiſely termed non-naturals *. Yet, ſome were willing, eſpecially when the dura mater was hurt, to prolong the doubtful period to the hundredth day. How ill the calculation accords with the real fact, how many exceptions there are to this general concluſion, how very far the period of exfoliation, and conſequently of danger, extends beyond the fortieth, or the hundredth day, you will learn from the following obſervations.

" Donald M'Kay, twenty-nine years of age, after ſerving long in India, was embarked, in perfect health, for England. The regiment being drafted, the ſergeants, corporals, and drum-boys, were ſent home. They were embarked for home by a circuitous rout; firſt put on board at Madras, then carried to Bengal, and thus they ſpent nearly ſeven months at ſea before they reached the Cape. There M'Kay was ſuddenly ſeized with the jaundice, was very yellow, and ſickly, with loathing of food, depreſſion of ſpirits, and that kind of languor which he had often felt during the hot ſeaſons in India. Of this oppreſſive diſeaſe he was not entirely recovered when he arrived in his native country.

" While coming down the Britiſh Channel, ſitting between decks, with his meſsmates, at dinner, a quarrel fell out betwixt two corporals of his regiment, about their ſhares in the meſs. The wranglers were about mid-ſhips, and when he heard their quarrel run very high, and ſaw them about to ſtrike, he ſtarted up from where he was, ſitting by a gun, and being in anger, and entirely forgetful of the nature of the place he was in, he ſtruck his head with ſuch violence againſt a beam, that he fell back into his chair, and lay for a long time as if dead, with his comrades about him, doing every thing they could to reſtore him. He recovered in about half an hour; and, although ſtunned and ſtupified with the blow, he was not ſickened; but next day, and indeed till now, a ſpace of four months, has been in his uſual health.

" Of all kinds of blows, this perhaps is the moſt violent; and, though his ſcalp was not cut, nor the leaſt particle of blood drawn, he obſerved, about the third day after, a tumor, which was from the firſt very painful. He hoped that it would diſappear, and neglected to mention it to the ſurgeon; but it waxed gradual-

* " Mirandum ſane Juriſtas tranſacto 46. die in capitis vulnere, nullum amplius ſubeſſe periculum ſtatuiſſe, ſique poſt dictum tempus letho tradi contigerit ægrotantem, id nequaquam in vulnus rejiciendum eſſe decernunt." —*Schenkius*, p. 18.

ly larger, and from being, as on the third day after the contuſion, ſmall, hard, and knotty, no bigger than the point of the thumb, it was, by the end of the month, as large as a gooſe's egg, not at all painful, and very ſoft.

" He was now on ſhore in England, for he was landed the third day after the blow. His life was perhaps leſs correct, or regular; he was now expoſed to the viciſſitudes of weather. He had come to Scotland, his native country, and was ſtationed at Perth, when the tumor inflamed, became extremely painful, ſo that he could not wear his hat, and was full of matter, which induced the regimental ſurgeon to open it with a lancet; matter flowed profuſely, black at firſt, as if from a mixture of blood, and afterwards pure; and from that moment he was relieved from his pains; the day on which the tumor was opened, he was on guard, in good health and ſpirits, and diſturbed by nothing but the pain and bulk of the tumor. When the matter was diſcharged, and the ſurgeon paſſed his probe into the orifice, he was ſenſible of the roughneſs of the bone, and M'Kay himſelf felt it grate againſt the ſcull. The tumor was thus opened exactly three months after the blow. About fourteen days after, the right eye ſwelled very much, and was at laſt cloſed, with a ſoft and puffy tumor, which induced the ſurgeon to dilate a little the opening in the ſcalp; but it had contracted again before he came under our care, (which was exactly four months after the contuſion), and was almoſt cloſed, ſo as to give vent, with difficulty, to a thin and acrid ſanies; therefore it needed to be again dilated with the biſtoury.

" Upon laying open this ulcer, the bone was felt with the probe, and with the point of the finger, bare, and completely carious; it was ſoft, ſpongy, and the probe entered deep into its ſubſtance, in ſo much that I was fearful of its penetrating actually to the dura mater; it appeared indeed to me, that the matter of the ulcer was heaved up with ſuch regular pulſation, that it muſt have actually received the impulſe from the motions of the dura mater.

" The ſymptoms which immediately enſued, indicated the greateſt danger. It is ſome time before we feel quite at eaſe in probing ſuch a ſore, and we are ſtill longer before we can perfectly underſtand what we feel;—it was in this inſtance not till the fourth day, that I could, without danger or violence, aſcertain with my probe the ſtate of the bone, and then I recogniſed, as in the caſe of Sharpe, and of the old woman, that deep-ulcerated trench, which ſeparates the ſound from the carious bone; when I felt this decided mark, I could certainly predict an exfoliation of both tables.

" But now an alarming and fatal ſuſpicion aroſe of this being a venereal caries, and of great extent; for, along with the ſuſpicions naturally attached to his profeſſion of a ſoldier, there appeared a diſtinct tumor, a new abſceſs, and, upon opening it, a greater extent of carious bone than we had ſuppoſed. Upon inquiry, I found, that the blow had been immediately followed by a general and extenſive tumor; that the fore-part of this tumor being opened, the whole was leſſened; the back-part, as well as the fore-part, ſubſided in ſize; but the back-part, in proportion as it ſubſided, formed a diſtinct tumor, and terminated in a ſeparate abſceſs, yet ſuch a one as plainly implied, that both ſuppurations and ulcers opened upon one carious ſurface. Now his appetite and ſtrength failed; his face was ſallow and ſickly, and every thing in his manner, voice, and action, indicated extreme languor. There was a general ſoreneſs of the neck and throat, and the head was, by a ſort of ſpaſmodic contraction bent down to one ſide. He had a regularly intermitting pain of the head, which came daily at three in the afternoon, with a fever-fit, and a heavy and ſtrong pulſe. The arteries of his head, he ſaid, beat very ſtrongly, and he felt as if a pendulum were continually ſwinging in his forehead, with a heavy dull pain over all the head, and a ſharp and torturing pain ſhooting down along the left ear to the contracted part of the neck.

" Such was his condition before the exfoliations took place. A large portion of the ſcull was caſt off. The pulſations of the brain, and the granulations of the dura mater, were diſtinctly ſeen, and I allowed two months to elapſe before I renewed my notes of his caſe, when I marked down theſe circumſtances, " that he was now in a very altered condition; his pains in the head gone,—his neck flexible and eaſy,—his face chearful and contented,—the opening nearly healed,—his appetite, and general health, improving,—and the cicatrices becoming firmer every day. Nothing of theſe changes can be attributed to a very ſlight courſe of mercury, which he has taken for three weeks only, and has now left off. I look for his being diſcharged in a very few days, in perfect health *."

* Such is my hiſtory of this man's caſe, to which I now take a pleaſure in adding the hiſtory of his former life; for, in theſe circumſtances, we could not be without ſuſpicion of venereal diſeaſes. In man or woman, it is difficult to extort a true and ingenuous confeſſion; yet, from a ſoldier, a manly and ſenſible fellow, who knew the world, I expected to hear the plain truth: A ſoldier is careleſs in contracting, but equally free in avowing ſuch complaints; and I had ſat many hours on his bed, to learn his real condition, and conjured him, as he valued his health, or life, to conceal or diſguiſe nothing. " Eight years ago, while ſerving under Lord Cornwallis, in the field, he contracted the venereal diſeaſe; but, being in Tippoo's country, and in the face of

I ſhall preſently relate to you a moſt intereſting caſe, in which, by perſeverance on the part of the ſurgeon, and courage on the part of the patient, worthy of its reward, a carious portion of the ſcull was ſucceſsfully cut away. It is my opinion, that the carious bone of a member may be left, till it be diſcharged or looſened by nature; but that when a vital organ, as the brain, is endangered by ſlow exfoliation, the bone ſhould be removed as ſoon as it begins to ſhake; that life being at ſtake, nature, when ſhe makes the effort, ſhould be aſſiſted, but always modeſtly and delicately. There are circumſtances, in which

the enemy, he would not put himſelf upon the ſick-liſt, and was in danger of being imperfectly cured. It was towards the end of the campaign, and when they were about to take quarters for the monſoon ſeaſon, at Bangalore, that he was infected. He had ſmall ſores upon the penis, and a ſlight ſwelling in the groin; but, purchaſing medicines from the black boys who attended the ſurgeons, he cured himſelf; for he got ointments with which to dreſs his bubo, which had burſt, and he then took powder of white mercury, till it ſalivated him. At this time they were on their return from Seringapatam to Bangalore, ſometimes traverſing hunting-grounds, ſometimes occupied in ſubduing the leſſer hill-forts, but always in action, and never a day out of the field. He arrived at Bangalore as the rainy ſeaſon commenced. He had taken the calomel but fifteen days, but he was ſalivating ſtrongly; after reſting ſome time in quarters, the ſwelling of his neck, and foreneſs of his mouth, went off. His ſores healed, and he continued in perfect health for two years.

"The war being cloſed, and his regiment quartered in the Carnatic, about forty miles from Madras, he was, without any intermediate affection, without any apparent remains of his diſorder, ſeized one cold night, when he had got wet on guard, with pains which ſtruck into all his bones, eſpecially on the left ſide of the body, and the trunk was as much pained as the limbs. He had occaſionally felt pains in all his bones, and eſpecially had often ſuffered during the night excruciating pains in the middle of the long bones, and eſpecially in the ſhins, but no tumor, not the ſlighteſt appearance of exoſtoſis ever enſued. This extremely cold night entirely laid him up; and he lay three months in the hoſpital quite unfit for duty. The pains were now concentrated in the ſhins. His pains were for ſeveral months very excruciating, eſpecially during the night. Small nodes alſo now appeared on the ſhin-bones. The extreme violence of the pains continued nearly ſix months; during which, he rubbed the parts with camphorated oil, took mercury, till his mouth (though he was never ſalivated) was very ſore. The nodes were about the ſize of a hazel-nut, very hard, very painful, and very difficult to remove. Though he was weakened by the confinement and the mercury, he preſerved his general health, and left the hoſpital, perfectly cured in ſix months, and then reſumed his duty, which was now pleaſant to him, from his having been at once promoted, and been reſtored at the ſame time to perfect health. Yet the nodes had not entirely ſubſided. The pains were ſtill ſevere; for three years he uſed no mercury; but, juſt before leaving India, he entirely recovered from theſe pains, by applying ſpirits of turpentine, which he uſed ſo ſtrong, and ſo inceſſantly, as to bliſter all the ſhins. This was thirteen months before his arrival in England, and before the time of this contuſion. After the moſt careful inquiries, I find no reaſon to doubt, that his pains were rheumatiſm, ſuch as is frequent in India, even among officers, after ſerving many campaigns. I have no doubt, that whatever ſyphilitic complaints he had were cured; and ſee not the ſlighteſt reaſon to believe that any taint remains; his caries was a ſimple contuſion; the ſymptoms long delayed, and his danger very imminent."

it is plainly our duty, not only by ſhaking and moving the deciduous piece, but by cutting and trepanning the ſcull, to remove it; for, when the integuments have ſloughed off; when much, or the whole of the cranium is bare; when the dura mater is ulcerated over almoſt all its ſurface; when one ſeparated piece of bone ſupports an ulceration and caries over a great extent of the ſcull; I ſhould (in hopes of removing that inſulated piece of bone) proceed to the moſt dangerous and fatiguing (for theſe are not painful) operations, as freely as I ſhould pull a thorn out of the fleſh.

The following intereſting caſe, communicated to me by my able and much-eſteemed friend Profeſſor Jeffrey, and related by his nephew Mr M'Dougall, who attended the patient in her laſt moments, will, I believe, be highly gratifying to you. As the patient I have juſt alluded to was ſaved through perſeverance and courage, this young woman was loſt from perverſeneſs and fear; yet I know not how we are entitled to uſe ſo harſh a word as perverſe in deſcribing the waywardneſs of a patient who feels all the horrors and confuſion, without being conſcious of the neceſſity, of the uſefulneſs of an operation, ſo unuſual as that of cutting out an extenſive portion of the ſcull.

" A young woman, living then in London, about ſix and twenty years of age, was ſtruck down by a ſmoothing-iron falling from a height where it had been careleſsly hung, perpendicularly upon her head. It ſtruck her on the top of the head, on the upper part of the left parietal bone. She was conveyed to an hoſpital in a ſtate of inſenſibility, and continued delirious for ſome time. She was bled, the head ſhaved, the wound in the ſcalp enlarged; and when ſhe recovered her ſenſes, ſhe complained of a ſenſe of giddineſs, accompanied with pain of the head, which continued for many weeks. Of the ſtate of the bone ſhe had never been diſtinctly informed, but could perceive at the end of ſome months, that the ſurgeon, or his aſſiſtant, at each dreſſing attempted to extract a large piece of dead bone, which was moveable, and which they ſhook and pulled in various directions. During theſe attempts, the ſore was dreſſed with lint, and poultice was occaſionally applied.

" She remained very long in the hoſpital, (eight or nine months), where her health having ſuffered greatly, the phyſician ſuggeſted to her the propriety of removing to the country. She complied with this advice; and after three or four months ſpent with her friends, ſhe returned to the hoſpital much recruited. Many and various attempts were now made to diſengage the inſulated piece of

bone. Her health began again to decline, her appetite failed, ſhe was greatly reduced by fever, fits, and profuſe perſpirations. The diſcharge from the carious ulcer, profuſe as it had always been, was now greatly increaſed, becoming more profuſe, and extremely fætid, as ſhe fell weaker. Nouriſhing diet and cordials were not ſpared. She felt that her health could not improve in the air of an hoſpital in London, and reſolved to return to Scotland, to live or die among her friends; weak as ſhe was, ſhe performed actually this journey of 400 miles in a mail-coach.

"When leaving London, the gentlemen under whoſe care ſhe had been, charged her never to permit any operation for the removing of the carious part of the ſcull. They remarked, that the bone, which was ſlowly decaying, would be at laſt diſengaged by the ulceration and eroſion deſtroying thoſe parts by which it was ſurrounded; that to this alone ſhould ſhe truſt; the proceſs of nature, they ſaid, was ſafe, and ſure to happen, if ſhe could but regain her health; the expedient which would probably be propoſed to her, of applying the trepan, extremely dangerous.

"On her arriving in Glaſgow, and applying to Mr Anderſon, an eminent ſurgeon in that city, his opinion was ſo entirely oppoſite to this, he was ſo perſuaded of the propriety of removing this inſulated bone, (now entirely uncovered), and of great extent, that he remonſtrated with the patient, argued with her friends, and aſſured all who had an intereſt in her, that the pain, irritation, diarrhœa, and fever, the want of appetite, and profuſe diſcharge, could not fail to bring her ſoon to the grave: But ſtill his advice was neglected, till at laſt her health manifeſtly declining, and her ſituation being in all reſpects hopeleſs, the operation was aſſented to.

"With the deſign of afterwards burſting up the corrupted part of the bone, he applied the crown of a very large trepan nearly on the centre of this extenſive caries; an operation which was not accompliſhed eaſily, nor at once; for ſuch was the perverſe and fretful temper of the patient, fatigued with pain and ſuffering, that ſhe ſubmitted very ill to the operation; ſuch, indeed, was her real weakneſs, that in place of completing the perforation at once, Mr Anderſon thought it prudent to allow two days to elapſe betwixt the firſt and ſecond application of the trepan.

"By this central perforation, (the place and effects of which may be under-

ſtood by the drawing), the inſulated bone was converted into a broad ring; it was of the form of a quoit; and a ſecond perforation, with a ſmaller crown of a trepan, would have divided the ring, have reduced it into the form of a creſcent, and have enabled the operator to break up and extract the caries, without endangering the dura mater. But he was not permitted to complete his operation; if there was either danger or pain in the operation, he had done all the harm, but was permitted to do none of the good that might have been expected. Though prevented from fulfilling his more important duties, he continued his charitable viſits to the patient. He ſtill hoped, in ſome period of pain, or from a deliberate conviction of her danger, that ſhe would allow him to complete his operation; but, wearied with oppoſition, and finding himſelf really uſeleſs, he at laſt withdrew.

"It was from charitable motives only, to ſoothe and alleviate her diſtreſs, without the ſlighteſt hope or deſign of offering any more important aſſiſtance, that Mr M'Dougall now agreed to attend her, and aſſiſt her friends in applying the dreſſings, and keeping her ſore in the beſt condition. The ſtate of matters at this period is excellently well repreſented in the following report by Mr M'Dougall.

"On removing the bandage and dreſſings, I had now an opportunity of ſeeing the extent and appearance of the diſeaſe. The ſcalp had ulcerated and ſloughed off to the extent of five or ſix inches in diameter, expoſing almoſt all the upper part of the ſcull. The inſulated piece conſiſted of the upper and back part of the right and left parietal bones. It extended from the lambdoid ſuture behind, to within two inches of the coronal ſuture before. The ſagittal ſuture was ſeen to run along the middle of this caries, which meaſured tranſverſely five inches, and longitudinally three inches and a half. A great part of the external table of the looſe bone had mouldered away, and the dura mater was ſeen through the trepan-hole, and through many ulcerations in the ſcull, covered with pale unhealthy granulations. The edges of the ſcalp were ſwollen, livid, and painful, and the diſcharge of pus was profuſe, of a dark colour, and very fætid. The inſulated piece of bone was immerſed in matter, blackened on its ſurface, and incruſted with the diſcharge. I could eaſily move this piece of bone a little way upwards or downwards, or to either ſide, the thin edges of it paſſing at each movement under the edge, or between the tables of the ſurrounding bones. It could even be depreſſed a few degrees, though the re-

Fig. 1. Drawing of the living and Gangrenous abscess of the Brain, such Abcess is described in the Case of Thompson Page 797

Fig. 2. Drawing of the Scull of the young Woman hurt by the fall of a smoothing-Iron, Universally Carious and unsuccessfully Trepanned Page 447

Drawn by J. Bell.

Engraved by E. Mitchell Edin.

ſiſtance to this was very conſiderable; nor did the patient complain of any uneaſineſs. It was this reſiſtance that enabled Mr Anderſon to apply the trepna on the inſulated piece of bone itſelf.

" Compreſſes had been applied to prevent the matter from deſcending betwixt the cranium and ſcalp, but without ſucceſs. The matter had worked its way downwards, forwards, and backwards, had deſtroyed the cartilaginous tube of the external ear, giving a free exit to the diſcharge through the external meatus, and had ſeparated the ſcalp from the ſquamous portion of the temporal, from almoſt the whole of the left parietal, and from a g eat part of the occipital bone. The matter had deſcended to the neck, and formed a large collection there, which pointed; but the patient would not allow of a counter-opening. The application of compreſſes, to prevent its accumulation, was now out of the queſtion, for the ſcalp covering the left and back part of the cranium had become livid, and extremely painful to the touch, and as thin as paper. A bent probe, when introduced under the ſcalp directly backwards, could be paſſed down to the neck, and made to turn round the convexity of the ſcull, till it was withdrawn oppoſite to the ear. The bone felt rough, and denuded of pericranium throughout this whole circuit. The matter exuded alſo from under the bones of the cranium, and had detached the dura mater from them to a conſiderable extent laterally, and downwards to the baſe of the ſcull.

" The ulcerated ſcalp was dreſſed morning and evening with a pledget of lint, covered with ſoft ointment. Tow was applied above the lint, to abſorb the matter, and the whole was retained by a bandage looſely applied. At each dreſſing, about an Engliſh pint of a dark-coloured fætid matter, very much reſembling coffee-grounds, could, with gentle preſſure, be forced up from the neck, and from betwixt the cranium and ſcalp on the left ſide, and diſcharged at the large opening above. The ſcalp bled on the ſlighteſt touch, but the blood was almoſt without colour.

" The patient had at this time ſurvived the accident twenty-three months. She lived about a month longer, her debility daily increaſing till ſhe died.

" The extent of this caries, the form of the inſulated piece of bone, the central opening made with the trepan, and the ſucceſs which muſt have attended a ſecond perforation, will all be underſtood from the ſketch which is laid on the ſame plate with the drawing of a ſuppurated brain. The loathſome condition of this poor debilitated creature, with the profuſion of matter running

from the head, the integuments insulated down even to the neck, the extreme fætor of such an extent of carious bone, may be conceived from Mr M'Dougall's sketch. One circumstance is mentioned, in which you will find an interest, since it corresponds with many of the facts I have lately laid before you, viz. that the dura mater, which was detached and ulcerated to so great an extent, was thickened wherever it continued to adhere to the scull *."

I do not know a case by which the parallel I have ventured to suggest, of a contused scull with a carious tooth, is so well vindicated, as that recorded by Mr Marechal, of the French Academy, in the following terms: "A young lady, of about ten or twelve years of age, was struck with a triangle of iron, which fell upon her head. There was no wound. The young lady was soon well, but there remained a fixed and pointed pain in one spot, in the place of the parietal bone. This pain was aggravated from time to time in paroxysms, so violent as to be attended with fever. The fits of fever were abated by bleeding, and various remedies, but the pain continued for years, and was so excessive, that they were induced to consult Mr Marechal, and to comply with his advice, when he recommended that the trepan should be applied. The opinions delivered by the surgeons, and the submissions of the patient, imply great suffering, else the one would not have proposed, nor the other have endured, an operation so doubtful in its issue. Mr Marechal laid open the bone,—applied the trepan, and remarked, in sawing the scull, that it was as dry as a church-yard scull; and the operation was so perfectly successful, that from that moment the pain entirely ceased †."

Nothing can be more certain, than that the caries of the scull may continue harm-

* "I need not, Sir, send you a copy of my notes of the dissection; nothing very remarkable presented itself, and the preparation will explain, better than words can, the extent and consequences of this fracture. I may remark, that the dura mater adhered very firmly, where it was connected with the parietal bones anteriorly, and was in general much thickened in its substance.

"PETER M'DOUGALL."

† "Une demoiselle de dix ou douze ans fut frappée par une tringle de fer qui lui tomba sur la tête; ce coup ne fit point de playe, la demoiselle fut bien-tot guérie, à la réserve cependant d'une douleur de tête fixe et peu étendue, qui lui resta sur un des pariétaux. Cette douleur augmentoit de tems en tems, même jusqu'à lui causer la fiévre que l'on appaisoit par les saignées et les autres remédes généraux; mais la douleur persévérant toujours depuis plusieurs années, M. Maréchal fut appellé, et jugea le trépan nécessaire. Il découvrit l'os à l'endroit de la douleur, et y appliqua une couronne de trépan; il remarqua que la scieure de l'os étoit séche comme cellé d'un crâne qui auroit été long-tems enterré. Cette opération réussit si bien, que la douleur cessa entiérement et pour toujours.

leſs: That it is the ſuppuration by which the piece of inſulated bone is ſeparated from the ſound ſcull, and from the dura mater, that occaſions danger: That there are not always ſymptoms denoting that danger, ſo as to lead us to take meaſures to prevent it: That while the danger is ſuſpended for months, the moment ſymptoms of a bad tendency appear, we have reaſon to pronounce the patient loſt, paſt all remedy. I do not remember any more conſpicuous example of this, than a caſe related by Morgagni, in ſupport of that weak unfortunate prejudice which he had taken againſt the operation of trepan;—unfortunate, for, in the cities of Italy, hundreds periſhed unaſſiſted; and weak, ſince the very facts by which he maintains his opinion are expreſsly ſuch as a ſenſible or experienced man would have looked upon as but too certain proofs of the folly of depreciating, and the danger of neglecting, one of the moſt neceſſary operations in ſurgery.

"A young woman, (and here not having the original by me, I am obliged to truſt to a pedantic and ignorant tranſlation), of no mean parentage, of a ſlender make, of a weak but healthy conſtitution, who had never had any diſorder, except that ſhe had once been afflicted with ſome convulſions, which did not continue; being in good health, and ſitting on a low ſeat, ſhe was ſuddenly alarmed, and hearing a loud noiſe, ſhe ſtarted backwards, ſo as to ſtrike her head violently againſt a marble-ſlab which projected from the wall.

"This happened on the laſt day of March, in the year 1739. She felt no inconvenience for ſome days. Then there was a ſlight pain in the part injured, followed by a painful rigidity of the muſcles of the neck. Yet theſe ſymptoms were ſo very ſlight, that the patient went about the uſual occupations at home or abroad. Who, then, (ſays Morgagni), would at ſuch a time have propoſed to trepan the cranium? what conſultation would have authoriſed? what delicate woman would have ſubmitted to ſo ſevere an operation?"

Take now the reſt of this hiſtory. "She went on thus to the month of Auguſt, without any other inconvenience than what I have juſt deſcribed. On the ſixteenth of the month, I was ſent for, when her regular phyſician gave me the narrative which I have here detailed. He further ſaid, that ſhe had been feveriſh for ſome days;—that her pulſe was hard;—that the muſcles of the neck were ſwelled, rigid, and pained;—that a ſimilar pain deſcended along the ſpine, and that the lower jaw was almoſt fixed;—that ſhe was lethargic, anſwered very ſlowly;—that ſhe was occaſionally delirious;—that her right ſide was ſomewhat affected;—that her

eyes appeared ſlightly convulſed;—that theſe latter ſymptoms had remitted for a few days paſt, while the others continued.

"He alſo mentioned, that the pain in the injured part had of late returned, though without the ſlighteſt external tumor, or diſcolouring. On ſeeing the patient, I felt but too ſenſibly that all he had ſaid was true, that there was now no room for remedies. Having, therefore, (ſays Morgagni), propoſed *ſome things of little importance, on which no calumny could fall, merely in compliance with cuſtom!* I called aſide one of the elder relations, told her how much I feared for the patient's ſafety, and took my leave, with the deſign of returning no more; and indeed her ſpeech forſook her a few hours after I had taken leave of her. In two or three days ſhe died *."

This is the very caſe of the Serjeant M'Kay, with that ſad variety of ſymptoms which we always have reaſon to fear. But Morgagni wanted impartially to reaſon, on this, as on an indifferent point, or to perceive that there can be no principles for the treatment of abſceſs in any leſs precious organ, that may not apply to abſceſs of the brain: That every abſceſs, to ſave the ſurrounding parts, may be opened: That an abſceſs is to be more carefully watched, and earlier opened, in proportion to the ſtrength and reſiſtance of the capſule, membrane, faſcia, or bone under which it is confined: That, *a fortiori*, the brain, the moſt important organ of the body, muſt be preſerved from ſuppuration at every riſk: That no force of ſuppuration can make its way through the ſcull: That although the diſtinct fluctuation of matter, the poſitive proof of its exiſtence, muſt be in other parts our ſole rule of conduct, ſuſpicion, mere ſuſpicion, calls us to open any abſceſs that threatens the brain. Morgagni had not the impartiality to reflect juſtly on this caſe; to reflect, that death was pronounced to be inevitable, while ſafety ſeemed poſſible: he pronounced the patient dying; and ſurely it is not poſſible to be worſe than dead. He who thus pronounces ſentence of death, proclaims (according to the often repeated adage) any remedy deſirable. His blameleſs remedies were culpable negligencies, and his "compliance with cuſtom," a dereliction of duty; and to ſpeak thus tenderly of his own reputation, which neglecting his laſt duties to this patient, though a language extremely common, is ſuch as cannot be approved. "To eſcape calumny," may be thus an object with the phyſician; but we perceive, that in regard to the patient it is a kind of treaſon. There is, in every profeſſion, as well as in war, a bravery and ſpirit of enterpriſe, which opens the way for good

* Alexander's Tranſlation, vol. iii. p. 140.

fortune; and, in this queſtion, it is moſt natural to remind you, that an operation can give no pain to a patient who has loſt his feeling; that the perforation of a bone is to be judged right or wrong, not by the pain, for there is none; but by the neceſſity of the caſe, when there is no other hope for life; and by the chance of ſafety, however ſlender it may be.

But, of Morgagni, and his blameleſs remedies, I ſhall ſpeak more fully by and by. With his moral doctrines I have no concern, but his profeſſional prejudices I ſhall not ſpare.

Such accidents are, indeed, a matter of daily obſervation, and it ſhould enter into your reaſoning on every ſlight affection of the head, where a perſon, though in apparent health for months, remembers to have had a blow. "I remember (ſays Marchetti) another patient, who being hurt on the top of the head, but without any uncovering of the bone, or any dangerous ſign, was cured by his ſurgeons, and continued for three months in uninterrupted health. At the end of that time he was ſeized with a low fever, but without the ſlighteſt relation to his head. On the ſeventh day, he was diſtracted with pains in the injured part of the head, though it had been long heal, and now ſhowed no ſigns of any thing wrong. On the fourteenth day of the fever, he died. On diſſection, I found pus upon the dura mater and brain: ſo falſe is the vulgar opinion, that after the fortieth day, a man wounded in the head will not die *."

That a bone, to become carious, muſt be expoſed, or that, to be annihilated, it muſt be eroded by an open ulcer, is not conſiſtent with the notions I have taught you of a diſeaſed bone. A bone may be as thoroughly deſtroyed by an internal ulcer, as the ſtomach, the lungs, or the cellular ſubſtance of the loins, or the vertebræ of the back. I have many times, in diſſection, found the vertebræ ſoldered together by a callus, the certain produce of an internal ulceration which had healed. I have found the bodies of the vertebræ of the neck inwardly corroded by ulceration, when no ſuch diſeaſe was apprehended. I found once the head of the ſhoulder-bone

* "Alium etiam vidi leviter vulneratum media capitis parte, non detecto oſſe, et nullo apparente ſymptomate, qui à chirurgis ſanatus, tribus poſt menſibus, quibus incolumis ſemper vixit, correptus fuit febre maligna, ſine ullo ſymptomate vulneris capitis; poſt ſeptimam dolor capitis ſubortus, loco vulneris inflicti tribus ante menſibus, in quo tamen jam ad cicatricem deducto, nihil apparuit, ægro decima quarta mortuo. Secta calvaria modo jam dicto, pus ſupra membranas, et cerebrum deprehendi; ut propterea vulgi opinioni credendum non ſit, poſt quadrageſimam diem, capite vulneratos, ratione vulneris mori non poſſe."

thoroughly carious, and much of it eroded; and thus does it often happen with a contufed part of the cranium, of which we have a very fingular example, related by Laffus. "A young man being ftruck with a ftone on the parietal bone, the wound was cured in the ufual time. But, about ten years after, a fmall foft tumor was obferved on the injured part, having a very vifible pulfation, and accompanied with exceffive pain when preffed upon.

"Thofe who were confulted, pronounced it an aneurifm. Various quackifh prefcriptions were applied to it. The pulfation and headachs increafed. The fever was unremitting. The patient was altogether deprived of reft, and the tumor pufhed out to the fize of the largeft hen's egg, occupying a great portion of the right parietal bone. The pains of the head having become exceffive, and extended from the difeafed fide over all the head, the patient would have it opened, in oppofition to the opinion of feveral practitioners. The opening of the tumor was followed by hemorrhagy; from the centre of the tumor, they hooked out with the fingers many clots of blood; and when the fore was thus cleanfed, there was feen through a large opening in the fcull, the dura mater, white and found. But, from lofs of blood, the patient fainted; his pulfe fell very low, and, in a few hours after the opening of the tumor, he expired. On diffecting the head, there was found a great lofs of fubftance in the parietal bone. The dura mater found, but depreffed, fo that the right hemifphere of the brain was repreffed towards the left-fide *."

Neither the flightnefs of the injury, nor the flownefs of this procefs, nor

* "Une jeune homme reçut un coup de pierre fur le pariétal droit. Il en réfulta une plaie qui parut fe guérir complétement dans un efpace de temps affez court. Mais environ dix ans après, on vit dans l'endroit qui avoit été frappé une tumeur molle, qui avoit des pulfations bien fenfibles, et qui caufoit beaucoup de douleur au malade quand on la comprimoit. Des perfonnes de l'art confultées décidèrent que cette maladie etoit un aneurifme. Différens topiques indiqués par des charlatans furent appliquées. Les douleurs de tête, et les pulfations de la tumeur, augmentèrent: la fièvre devint continue, et la malade fut privé de fommeil. Cette tumeur augmenta peu-à-peu, et acquit infenfiblement le volume d'une très-gros œuf de poule. Elle occupoit une grande partie du pariétal droit. Les douleurs de tête étant devenues exceffives, non feulement dans l'endroit ou étoit la tumeur, mais même du coté oppofé, le malade la fit ouvrir malgré l'avis contraire de plufieurs praticiens. L'incifion faite, il y eut une hémorrhagie affez forte, et l'on retira avec les doigts du centre de la tumeur plufieurs caillots de fang. Lorfq'elle fut complétement vuidée, on vit à travers un grand trou au crâne la dure-mère, qui étoit très blanche. Le malade tomba en fyncope par le perte du fang, fon pouls s'affoiblit, et il mourut trois ou quatre heures après l'ouverture de fa tumeur. On examina la tête, et l'on vit une grande déperdition de fubftance au pariétal, la dure-mère dans un état fain, mais déprimée ou enfoncée, ainfi que le lobe droit du cerveau qui étoit repouffé vers le coté gauche."

the final unhappy fate of the patient, nor the entire deſtruction of the ulcerated bone, muſt ſurpriſe you, for theſe are phenomena perfectly conſiſtent with the moſt common laws of the animal œconomy, and confirmed by many ſimilar facts. The following ſimple narrative of the ſame diſeaſe, produced by the ſame cauſe, a ſlight blow, enduring for ten years, growing with the body's growth, and ſtrengthening with its ſtrength, but at laſt cured by a nice and delicate operation, will intereſt you. It is related by Wiſeman, ſerjeant-ſurgeon to Charles I. in nearly the following terms:

"A lady fell down, with her child of half a year old in her arms. The mother was hurt, and the child ſlightly ſcratched on the left ſide of the head. The hurt was viewed by ſome pretenders to ſkill in ſuch things, and judged of no moment: But from that time the child grew indiſpoſed, and vomited often, eſpecially after receiving her ſuſtenance; and, as ſhe grew able to ſpeak, complained of pain in that part of her head; and, by reaſon of her frequent vomiting, and conſtant pain, ſhe languiſhed daily. After ten years, a ſmall tumor appeared in that part of the head which had been hurt. The parents again conſulted, and afterwards brought the child to me, a very ſtarveling. I viewed the tumor, and felt in it a pulſation, which at firſt I thought an aneuriſma; but preſſing my finger more into it, I felt the membrane of the brain, without any ſcull, the breadth of an Engliſh ſhilling. This at firſt a little amazed me: But, upon conſideration of the fall, and the ſymptoms ſucceeding, it was evident to me, that by the fall the ſcull was fiſſured; and being of a thin cartilaginous ſubſtance at that time of her infancy, *had through continuance mouldered away;* and the dura mater, thruſting outwards, had, by adheſion to the pericranium, united in one body with it. This I ſuppoſed the caſe. The preſage here was a ſudden death, if the cure was not attempted; and in the attempting it, ſhe was in great danger. To begin this operation by a circular inciſion, the compaſs of the tumor in the ſcull, was not difficult: But then to ſeparate theſe two membranes, the dura mater from the pericranium, or this from that, was an hard taſk even in a dead body; here in a weak child much more, where the blood would be apt to blind me, and the impatience of the child render it hazardous, the work of ſeparation requiring a great ſteadineſs in both of us. Wherefore, I reſolved to lay the ſcalp open by cauſtic. To which purpoſe, I forewarned them firſt of the danger, either in leaving the child to die by its malady, or attempting the cure doubtfully. But they having conſulted others before, were ſenſible of the danger the child was in by its diſeaſe, and readily commended her into

my hands, and lodged her near me. I caufed the hair to be fhaved off from the tumor, and applied upon it the moft gentle cauftic I could defign. At fuch time as I thought it might have made its way through the fuperficies of the calvaria, I took it off, and with a cauftic-ftone rubbed into the mufculous fkin; then wafhed out the falts well, with wine firft, then milk. After that, I embrocated it with warm oil, and cut into the efcar, embrocated the part again, and dreffed it up cum unguent. bafilic. with ol. rof. applying emplaftrum e bolo over all, with compref and bandage. That night fhe was feized with a fit of convulfion, frequently vomited, and was very ill. Dr Fifher was fetched, and prefcribed her a cordial julep, proper in her cafe, and relieved her. The next morning I took off the dreffings, and raifed up the hairy fcalp round from the fcull, fo far as the cauftic had fpread, which gave a breathing to it, and difcharged a little ichor. From that time her vomiting ceafed, as alfo the convulfive fits, and fhe began to be more lively than in ten years before. We kept her in bed, warm and clofe, and prefcribed her a flender diet, allowing her only fpoon-meats. Her phyfician took care in what concerned her health, by internals. I proceeded to haften digeftion, and by fomentations, and the like, to cherifh the native heat of the part. Some places I digefted, others I deterged. It was a nice work, but fucceeded happily. While fome floughs were feparating, other parts incarned, and cicatrized. The patient at length being in a fair way of recovery, I invited Sir Charles Scarburg, and Dr Walter Needham, to fee her dreffed. The dura mater was then incarned, and the edges of the bone exfoliating; after which the wound cicatrifed, and contracted to very narrow compafs. The child afterwards returned to her friends, perfectly in health, and is a witty child; but it is thought fhe will be but a dwarf*."

I offer this cafe to you, not as a precedent, or rule of practice; I have warned you againft touching fuch tumors. Nothing but fuccefs could vindicate this rafh operation. I relate the cafe, as completing the phenomena attending contufio cranii; and having defcribed to you all the varieties of the difeafe arifing from caries, I proceed, by another analogy, to illuftrate an affection of the fcull, a febrile caries appearing chiefly in fcrophulous habits, but excited by cold, and which is fufficiently frequent to deferve your notice: a difeafe which has given me much anxiety in practice, which has been a frequent occafion of controverfy among profeffional men, and of venereal difeafes being fufpected where none exifted. The difficulties in

* Wifeman, p. 139.

which I have felt myſelf involved, along with others of the profeſſion, I dare not mention to you, but I believe, that ſyphilis is chiefly ſuſpected as the ſole cauſe of diſeaſes of the cranium, by thoſe only who have not reflected on the perfect circulation and ſenſibility of the whole bony ſyſtem, and who have not ſufficiently remarked the obvious fact, of bone being as liable as any part of the body to be affected by diſeaſe as by injuries, by fever as well as by external violence.

" Daniel M'Bride, an orphan of fourteen years of age, was put to work at Dale's cotton-mill, at Lanark, when ſix years old, and remained there till he was twelve years of age. It is an aſylum for the children of the poor, the good order and liberal conduct of which correſponds well with the charitable deſigns of the proprietor; and this boy left it in vigour and perfect health, to go into the ſervice of a neighbouring farmer, where his employment was to herd cattle on the moor. He kept abroad the whole day with his cattle, endured every ſeverity of the ſeaſon; and being unconſcious of the neceſſity of exerciſe to fortify him againſt the cold, he was wont to ſeat himſelf by a dike, or under the ſhelter of a wall, wrapped in his plaid.

" On a ſevere winter-day, when the ſnow lay very deep, and drifted about him, the little creature did not return home from the morning till night-fall, and then benumbed with cold. He was no ſooner in bed, than he was in a fever;—his temples beating,—his head very confuſed, he was tormented with ugly dreams, and thought the devils were pulling him out of bed. He waked often from this perturbed ſleep, with a violent pain in his knee, and in the morning found himſelf lame, and quite unable to walk.

" During ſeveral days, the pain in his knee increaſed, and thence it ſhifted to the fore-part of the leg, on the ſhin-bone, and there it remained for three weeks. At firſt, when his knee was pained, it was at the ſame time ſwelled. When the pain ſhifted to his ſhin, the ſwelling deſcended to the fore-part of the leg. His whole leg became ſwollen, unſhapely, and as red as a roſe; and, at the end of three weeks, the gathering burſt on the middle of his ſhin, and left the bone expoſed and bare. Several openings ſucceſſively burſt out in different places along the ſhin, and at every new opening the dead bare bone was ſeen or felt. Unable to work, he left the farmer's houſe, and went upon the road to beg his bread. At laſt he found his way to town.

" When I firſt ſaw him, I found him leſs emaciated from want and pain than his hiſtory ſhould have led me to expect. Nor could I remark any of the uſual ſigns of

ſcrophula; for his hair was dark brown, his eyes of a deep blue, with a wide pupil; his upper lips, and noſe, ſmall, and well proportioned, and his countenance healthy, and he was of a ſquat and ſtubby form. The openings along the face of the tibia were numerous; the bone, through its whole extent, bare and black; partial exfoliations, at its upper part, had looſed the upper end of the ſhaft from the big head of the tibia, where it enters into the knee-joint, and the carious ſhaft of the bone protruded through the uppermoſt ſore."

Such is that ſhort deſcription which I find in my caſe-books, repreſenting, and in few words, my general conception of febrile necroſis, or death of the bone; and whether a bone dies from contuſion, is injured by cold, or periſhes from ſcrophula, (with the help of ſome ſlight occaſional cauſe), its death is accompanied with this ſudden fever,—this violent pain,—this inflammation, which ceaſes only when that ſuppuration is complete which ſeparates the dead bone from the parts ſtill retaining life. You will find it a juſt and uſeful parallel, and I haſten to prove that it is ſo, by preſenting to you, on the higheſt of all authority, a picture of the ſame proceſs deſtroying the ſcull.

"The Germans are accuſed (ſays Stoltz) by Siverinus, and various writers, of having ſuch effeminate and unmanly diſpoſitions, that they would rather die of any vile and loathſome diſeaſe, than ſuffer a neceſſary painful operation. How unjuſtly they are accuſed, I will prove by the following narrative. It is the caſe of Otto Erneſtus de Rautem, Lieutenant-Colonel, and lord of many ſeigneuries, a brave and reſolute man, of one and thirty years of age, of a ſtrong and muſcular form, of a bilious habit, full of health and ſpirits, a year and a half married, and lately become a father. On the 24th of Auguſt 1695, having left the army, and being on his return from Brabant to Germany, his native place, impatient to viſit his paternal domains, his friends, his lady, who might be on her way to meet him, he travelled by night in weather very tempeſtuous, and extremely cold, which he felt moſt ſeverely; and to this night's travel did he aſcribe all his future ſufferings. He arrived happily at home, but hardly had embraced his wife and friends, when ſuddenly he was ſeized with excruciating pains in the head, which for ſeven weeks after were continual, unremitting, torturing; and when they abated, there remained for eight days a vertigo and confuſion of head, which was allayed by a preſcription of Godſched, his phyſician.

"Hardly had three weeks elapſed, when thoſe dreadful pains returned, ſhooting through the head for fourteen days with excruciating torture. He ſet off

for Koningſberg, to conſult us. But, in the middle of his journey, when yet ſix miles from the city, and having arrived at Abbarta, one of his ſeats, his whole head ſwelled to ſuch a degree, that the preſſure of the fingers left deep impreſſions, and the ſwelling terminated in a few days in an abſceſs, as big as the largeſt peacock's egg; which, being ſoftened over night with a poultice, was in the morning opened with a lancet, diſcharged much pus, flattened gradually, and almoſt diſappeared on the fourth or fifth day; but ſtill the opening poured out a thin ſanies; nor, though moſt curiouſly dreſſed, could it be brought to cloſe in leſs than a quarter of a year *.

"Fourteen days had ſcarcely elapſed from the time of this fiſtula being cloſed, when the tumor roſe again on the ſame ſpot, to the ſize of a ſmall egg. Having heard a certain quack greatly praiſed for his ſkill, he made an excurſion to Heilkeim, a ſeat of his noble brother's, about half a mile diſtant from the caſtle, when a plaſter having been applied to the tumor by this famous empyric, the tumor burſt in the morning, and poured out a profuſion of pus. Thus did this nobleman remain for ſeven weeks under the cure of the empyric, by whoſe promiſes he had been allured, for he aſſured him that the abſceſs ſhould be cloſed in that ſpace of time. But, when the period was elapſed, the patient diſappointed, and this pretender fallen ill himſelf, of, I doubt not, a fictitious malady, he called a third ſurgeon, Bartholomæus Fuchs, a ſurgeon of Raſtenbourg; but, fearing to truſt himſelf ſole-

* "Immerito a Conrado Tigurino de ſcriptorib. chirurg. et Renerio Solenandro, conſ. 24. ſect. 4. uti refert et aſſentitur Marc. Aurel. Severini efficac. medic. l. 1. part. 1. cap. 3. tantæ mollitiei accuſari Germanos, ut turpi morte mori malint, quam generoſo animo unam dolorificam ſuſtinere operationem chirurgicam: verum reddere poterit vir generoſus et maxime ſtrenuus, Dominus Vice-Colonellus, Otto Erneſtus de Rautern, in Abbarten, Deutſch-Wilten, Gurgenau, Plenau, et Glugenſtein, dominus hæreditarius, triginta et unum annum natus, ſtaturæ mediocris, habitus carnoſi et firmi, temperamenti bilioſi, ſeſqui annum maritus, alacer et vegetus, unius filiolæ tum parens; qui 24. Auguſti, anni ſupra milleſimum ſexcenteſimum, nonageſimi quinti, cum in Brabantia functione militari ſe abdicaſſet, in patriam redux, ut ſibi obviam properanti dominæ conjugi anteverteret, noctu milliaria noſtratia (Germanica) cœlo adeo intempeſto et frigido, ut ex eo etiam refrixerat (quam refrigerationem mali hujus occaſionem fuiſſe, ipſe dominus patiens autumat), confecit; ad prædia ſua, et ſuos reverſus, dulcibus ab iis, et chara præprimis conjuge amplexibus exceptus fuit. Mox vero intolerabiles eum capitis invaſerunt dolores, ſeptimanas ſeptem continuas, indeſinenter affligentes, quibus deſinentibus octiduo circiter poſt, vertigo multum moleſtiæ exhibuit, quæ tamen poſt tranſmiſſi a domino licent. Godſched medicamenti uſum, evanuiſſe videbatur; immanes autem iſti dolores, hebdomadibus vix tribus elapſis, iterum ingruerunt, diebus quatuordecim, caput atrociter lancinantes, quare etiam contra dolores remedia quæſiturus, iter ad nos (Regiomontum) iniit; in medio vero itinere, cum ſex milliaribus ad huc Regiomonto, Abbartam (quod etiam prædium domini patientis eſt) ventum eſſet, caput totum adeo intumuit, ut ad preſſus, veſtigia primores digitos alta, relinquerentur; aſt

ly in his hands, he, under this ſurgeon's care, undertook the journey to Koningſberg, where Godſched, a licentiate, Auguſtin Groſmann, and Carol. Joſephus Viviani, an Italian ſurgeon, were called together to conſult. They found, upon examining the ſore, which was in the vertex at the meeting of the coronal and ſagittal ſutures, a ſmall fiſtulous opening, through which the probe paſſed three inches under the ſcalp, tending towards the occiput. The probe, upon being preſſed againſt the further end of the fiſtula, raiſed up the integuments; and at that point a ſmall opening was diſtinguiſhed in the ſcull itſelf. It was accordingly reſolved, that all this part of the integuments ſhould be opened with the biſtomy. On the 13th of September 1696, the integuments were thus opened, and the head bandaged up on account of hemorrhagy; and, on the 14th, the fleſhy ſcalp and pericranium, with the perioſteum, were divided with the ſcalpel; but as yet no caries could be obſerved in the place of the ſagittal ſuture. On the 15th, the third day after his arrival, a ſmall fungus began to protrude from the opening of the ſcull; but, as it was ſuch as might be eaſily ſeparated at any time, it was reckoned of no moment. He now returned home, provided with proper dreſſings; the part was daily embrocated with balſams, and dreſſed with proper ointments; every pains was

tumor hic in abſceſſum, ovi gallinæ Calecuticæ bene magni magnitudinis, triduo fuit ſupra verticem collectus, qui emplaſtro, per noctem impoſito, emollitus, die ſubſequente gladiolo ſeu lancetta apertus, multum puris fudit; et licet tumor quatuor quinqueve dierum intervallo, diſparuerit, indeſinenter tamen ichor, ſeu ſanies tenuis, ex eo promanavit, neque ad coalitum, quamvis probe deligaretur, et convenientia emplaſtra ac epulotica imponerentur, niſi poſt anni quadrantem, perduci potuit. De hinc, elapſis diebus quatuordecim, denuo, eodem quidem in loco, tumor, magnitudine minoris ovi, extuberavit, quare, cum Balneatoris Gerdavienſis ſibi haberet commendatam experientiam, Wilkeimum, prædium beati fratris ſui germani, Domini Wilhelmi Alberti de Rautern ſupremi, aulæ Brandenburgicæ, Mareſchalli ac Capitaneatuum Neuhauſen et Labiau Satrapæ, dimidio milliari ab arce Gerdaven diſtans, ſe contulit, ubi ex tumore, (emplaſtro ab accerſito Balneatore iſto, veſperi impoſito), mane rupto, pus magna vi erupit, ſubſtitit illic dominus patiens ſex ſeptimanas integras, promiſſis, ſe intra tempus hoc ſanatum iri, fretus, cum vero tempus hoc præteriiſſet, nec aliquid opis, quamvis quotidie deligatus eſſet, ſentiret, chirurgus inſuper ipſe morbo corriperetur (morbum fuiſſe ſimulatum ſuſpicor) tertium ſibi chirurgum, Dominum Bartholomæum Fuchs, Raſtenburgo adſcivit, cui ſoli cum ſe concredere dubitaret, eum ſibi comitem itineris elegit, hucque Regiomontum cum eo venit; acciti fuerunt, Dominus Joannes Godſched, med. licent. et P. P. ac Auguſtinus Groſmann, ut et Carolus Joſephus Viviani, Roma-Italus, chirurgi, qui inſpecto et examinato malo ſupra verticem, qua parte ſuturæ coronalis et ſagittalis ſibi committuntur, parvum invenerunt foramen, per quod ſtylus, longitudine digiti, ſub cute, occiput verſus, adigi potuit, qui ad extremitatem meatus offendens, cutem aliquantulum elevavit, quapropter eouſque eam incidendam eſſe, ratum fuit viſum, facta inciſio atque delegata die iſta (erat 13. Septembris anni 1696), ob hæmorrhagiæ metum.

" Die 14. Septemb. ſcilicet, panniculus carnoſus cum pericranio et huic adnato perioſteo, cultro inciſorio perſcinderentur, caries tamen in ſutura ſagittali nondum fuit obſervata.

ineffectually used to close the ulcer; a month had elapsed, and we were informed by this attendant surgeon, that the opening in the scull continued to pour out matter, and he returned to us to Koningsberg.

"Next day, the 11th of October, a new consultation was called: On the 13th, a physician, Dr A. Harweck, was added to our number: Grosmann the surgeon proceeded to probe the wound, and, having passed his probe into the opening of the scull, he found it passed onwards somewhat obliquely to the depth of an inch and a half. Encountering at that depth something hard, he withdrew the probe, persuaded that the scull could not be of this thickness, certain that he had penetrated into the cavity, certain also that what he felt was neither brain nor dura mater, nor the internal table of the scull, unless, indeed, some exfoliated scull from the inner table was lying upon the membrane. The consultation now agreed, that to ascertain what it was that lay so deep under the scull, the trepan should be applied; then a crucial incision was made, having this opening in the centre; the corners of the incision were dissected, and carried backwards, and, on account of hemorrhagy from the arteries of the scalp, the wound was dressed forthwith, and, not next day, but the day following, was appointed for applying the trepan. At three in the afternoon, the bandages having been undone, the cranium being bare, the seat of the evil was plainly seen. The bone, at the meeting of the coronal and sagittal sutures, was

"Die 15. seu tertia ab adventu ejus, supra foramen excrescentia quædam in conspectum venit, quæ tamen, quod facillime separaretur, habita fuit nullius esse momenti, quare postero mane,

Die 16. nempe, acceptis secum emplastris convenientibus, et balsamo vulnerario, domum revertit: applicata fuerunt emplastra, præmissis ex balsamo inunctionibus, debitæ quoque deligationes quotidie fuerunt institutæ, usque dum, quatuor hebdomadarum spatio elapso, cum ad coalitum vulnus perduci nequiret, sed foramen in calvaria, potius continue, pus funderet, comite itineris, modo nominato chirurgo Rastenburgensi accepto, quo vitæ et sanitati suæ consuleret, iter ac nos, Regiomontum, relegeret; accessit autem.

Die 11. Octobr. Convocatis itaque die sequenti dn. medico et chirurgis supra nominatis, de re videbatur esse, unum adhuc advocare medicum.

Die 13. Dn. Adamus Harweck, M. D. & P. P. etiam fuit adjunctus; pro investigando itaque malo, Dn. Grosmannus, foramini pus fundenti, stylum per calvariam, sesque digitum plus minus, oblique licet, immisit et ad quippiam duriusculum renitens illisit, quod illico retulit addens, calvariæ crassitiem tantam esse non posse, quanta quidem styli immissi longitudo cerneretur, ad interiora itaque penetrasse eum, esse manifestum; nec tamen cerebrum vel meningem, nec calvariæ interiorem laminam id esse; ad quod offenderet (nisi desquamatum laminæ hujus fragmentum, duræ matri incumbere, conjecturandum foret) cerebro enim durius, mollius osse reperiri: quo ergo, quid lateret intus, patesceret, trepanum adhibere statuerunt; facta propterea tunc fuit in crucem incisio, ita ut foramen, in medio præter propter, relinqueretur, et labra vulneris a cranio, quo sic denudaretur illud, avulsa et reclenata fuerunt, sanguine satis large effuseque profluente, pro quo sistendo, stupa sufficiente imposita,

rough and carious; the opening in the cranium was plugged up with a fleſhy excreſcence, of the ſize of the nail of the little finger; and the probe being inſinuated by the ſide of it into the cranium, paſſed very deep. The fungus was this evening pared away, and the ſore dreſſed.

" On the 15th, the conſultation was again convoked, and would now have applied the trepan, but for the ſoreneſs of the integuments, and other circumſtances of the wound; the fungus was again pared, the wound dreſſed, and the patient committed to ſleep, which was ſomewhat diſturbed with thoughts of the operation, which was next day to be performed.

" On the 16th, the firſt crown of the trepan was applied; and the circle of bone being picked away, its inner table was found black and carious. The fungus protruded, ſo as to occupy the trepan-hole, while the pus exuded by one ſide. Things looking thus ill, required deliberate conſultation; and, in order to proceed with more caution, other conſultants were called in.

" On the 17th, no change of ſymptoms, no diminution of the tumor appeared; a few carious ſcales being extracted, the probe paſſed under the ſcull more eaſily, eſpecially towards the right ſide; and the number of conſultants being again in-

deligatio conveniens adminiſtrata fuit; trepani vero applicatio, in diem perendinum, certas ob rationes, fuit dilata.

Poſt horam hujus diei veſpertinam tertiam, inſpecto vulnere, cranium denudatum, inque ipſo, futuræ ſagittalis et coronalis concurſu, mali ſedes comparuit, ipſumque os, aſperum et ſcabrum, carneque ſpongioſa et ad magnitudinem unguis minoris accedente, obſeſſum, fuit repertum, atque ſtylus in cranii foramen adactus, alte penetravit: reſecta itaque carne luxuriante, vulnus deligatum fuit.

Die. 15. Supra nominati dni. medici et chirurgi convenerunt, atque prium trepanum jam applicaſſent, niſi in craſtinum operationem hanc differendam eſſe, tum labia vulneris trepanum impedientia, tum obſtacula alia id diſſuaſiſſent. Unde diductis magis labiis, et exciſſa, quantum potuit, carne ſpongioſa, deligato vulnere, quietem ægroto, et uſum pulveris de die 13tia Octobris, injunxerunt: nocte exacta, quam varia inſomnia, ob inſtantem trepanationem interturbaverant.

Die 16. Trepanum primum adhibitum fuit, atque perforato cranio, exciſſum officulum exemptum, tota ſua interiori lamina cariem paſſum, ſub ipſa calvaria vero, ad matrem duram, fungoſa caro, per totum foraminis ſpatium et latius adhuc expanſa, ut et pus ad latus foraminis dextrum promanans, in conſpectum venerunt. Singulis res hæc altiorem peperit meditationem; quo enim affectus hic rarior, eo etiam gravior, curatuque difficilior habitus fuit: viſum eſt propterea e re eſſe, plures accerſere medicos, et cum conſilio aggredi curationem.

Die 17. Symptomata nulla obſervata, nec fungus immutatus apparuit, ex vulnere fragmenta quædam oſſea exempta, ſtylus, latus dextrum verſus, ſub cranium, minus vero ſiniſtrum verſus, adigi potuit; vulnus itaque deligatum debiteque munitum fuit, et cereviſiæ potus, decocto paſſular, addito, conceſſus; unde alvus laxior reddita: conceſſus quoque pro recreandis ſpiritibus, vini caliculus; veſperi eadem vulneris facies obſervata, eademque cura continuata.

Die 18. Et ego ad dn. ægrum, pridie illuc vocatus, acceſſi, et præter ſupra nominatos dn. medicos atque chi-

creaſed, and the parts carefully inſpected, this was the unanimous deciſion: "That, as the inner table of the ſcull, where it was trepanned, and the outer ſurface of the parietal bone to a great extent, was plainly carious; as the fungus extended beyond the trepanned part, and neither the caries nor fungus could be ſubdued otherwiſe than by bolder operations, the trepan ſhould be again applied."

"On the 19th, nothing farther was attempted, than the taking away, with the cutting forceps, three or four carious ſcales. The further extenſion of the inciſions was delayed to the following day; and again the patient paſſed an uneaſy night at the thoughts of the morrow's operation.

"On the 20th, the lips of the inciſion was again diſſected back, and ſufficient ſpace prepared for applying the trepan. During theſe cruel operations, he never moved his head, nor permitted a groan nor a ſigh to eſcape him: The inciſions being completed, the caries was diſplayed, extending from the junction of the coronal and ſagittal ſutures backwards towards the occiput, terminating in a fungous tubercle.

rurgos, etiam venerandum facultatis noſtræ ſeniorem, et tum temporis decanum, Dn. D. Georgium Woſeginium, P. P. ordinarium ſecundum, ut et Dn. D. Philippum Jacobum Hartmannum, P. P. M. extraord. illic offendi: reſoluta itaque per Dn. Auguſtinum Groſmannum (qui et reliquas per curationem totam operationes chirurgicas perfecit) deligatione, in conditionem ſeu ſtatum mali inquiſivimus, quo probe perſpecto, vulnus denuo deligabatur, adhibitis prius (quod etiam in deligationibus reliquis omnibus factum eſt) fomentis.

His peractis, de cura recte inſtituenda conſultabamus, caſum venerando noſtro dn. ſeniore ad artis præſcripta, proponente, qui, quod tum oſſiculum per trepanum primum extractum, tota interiore ſua lamina et ad latus ſiniſtrum, tum et oſſa bregmatis ſuperius magnam partem carie confecta cernerentur, ſub calvaria vero, fungoſa caro, ſuper matre dura expanſa obſervaretur, et neutrius curatio citra exciſionem inſtitui poſſet, de ulterius applicandis trepanis, nobis omnibus aſſentientibus, conſilium dabat.

Die 19. Nihil tentatum, niſi quod tria carioſi oſſis fruſtula, (quæ dn. patienti in manum tradebantur, forcipe inciſoria fuerint abſciſſa. Inciſio vero, ſeu cutis ſeparatio, in diem poſterum differebatur: comedit bene, noctem vero, forſan (ut et ipſe dn. patiens putabat) propterea, quod ſuſtinendorum poſterea die dolorum maximam animo impreſſerat acerbitatem, habuit inquietam.

Die 20. Diſciſſa cute, et inciſionum labiis, cum pericranio a calvaria extrorſum avulſis, pro applicandis trepanis ſufficiens ſpatium parabatur, larga ſubſequente hæmorrhagia, omnes tamen has effrenati doloris vehementias, tam incredibili cum animi robore perpetiebatur, et cohibebat coercebatque intra ſeſe dn. patiens, ut nullas voces indecoras, nec gemitum aut ſuſpirium ederet, imo caput, toto operationis tempore, per ſe, ſine ullius adjumento, adeo immotum tenebat, ut nec latum culmum ſitu ſuo id moviſſe, vere dici poſſit: facta inciſione, in conſpectum veniebat caries, in ſagittali ſutura a coronali incipiens, atque occiput verſus tendens, cum protuberantia in fine ſpongioſa, vulneri magna ſatis linamentorum diſcerptorum, ſeu ſtupæ quantitas imponebatur: per diem ut et noctem, ſenſit dn. patiens, in inciſionum labiis, dolores adurentes punctorios, qui et appetitum proſtraverunt, ſomnum item interceperunt. Sequenti

Die, 21. ſcilicet, iterum convenimus; ſtupa de vulneris medio auferebatur; reliqua vero, in inciſionum extre-

" On the 21ſt, we met again; the doſſils were withdrawn from the centre of the wound, but not thoſe which were introduced into the extremities of the wound, becauſe they adhered more firmly, and it might have renewed the hemorrhagy, had they been withdrawn. The extent of carious bone being meaſured, was found to be two inches in length; the patient now recovered his appetite and ſleep, unleſs when tormented with pain.

" His ſurgeon, Groſmann, being on the 22d obliged to leave town, the ſecond application of the trepan was again delayed. He paſſed the afternoon in pain, but was relieved by vinous fomentations.

" On the 23d, the day appointed for operation, there is deſcribed a perturbed and indecent ſcene; Farver the paſtor, and Aulic-Confeſſor, had anticipated their viſit, was ſtationed by the ſide of the patient, diſſuading him from ſuffering the operation, and was occupied in propounding formal ſyllogiſms, and maintaining long and idle debates with all preſent about the chances of cure, the powers of nature, the pains of the operation, and the dangers of the trepan. But theſe learned diſcourſes were at laſt interrupted by the noble patient, who, after exclaiming, " O God! ſupport me with your help!" placed himſelf in the chair for operation; and, turning to the ſurgeon, ſaid, " In the name of God, do with me what is right, whatever you have reſolved." He then exhorted him to perform his opera-

mitatibus puta, quod firmius, et quaſi conglutinata is adhæreret, nec ſine ſubſecuturæ hæmorrhagiæ periculo avelli poſſet, intacta relinquebatur. Horis promeridianis, cariei, in ſutura ſagittali, longitudinem circino dimetitus ſum, quam, ut monſtrat, invenii. Cibum melius ſumpſit, ſomnum etiam melius capere potuit, qui profundus fuiſſet, niſi ob dolorem, ex impreſſione labiorum vulneris, quoquo verſus caput inclinaret, incitatum, ſedendo dormire coactus fuiſſet.

Die 22. Ob Dn. Groſmanni, ſtatim, facta matutina deligatione, iter unius diei rus ſuſcipientis, abitum trepani applicatio adhuc procraſtinanda fuit, a meridie bene habebat, niſi quod quandoque a doloribus punctoriis, alternatim illapſis, mox tamen evaneſcentibus infeſtaretur; in abſentia Dn. Groſmanni, Dn. Viviani et Fuchs, circa veſperam, fomenta ex vino calido adhibuerunt, oleo roſaceo caput inunxerunt, et deligationem perfecerunt, cœna et ſomnus modicus ſubſequebantur; hic tamen, ob dictam modo cauſam, aliquoties fuit turbatus.

Ipſe etiam dn. patiens, ſermones noſtros interpellens, in ſequentia erumpebat: ("In Jeſu nahmen, ihr herren, ich hab mich in ihre Gervalt gegeben, ſie machen mit mir, wie ſie es gedencken zu verantworten"). Domini mei, ſubdidi me poteſtati veſtræ, peragite in me, in Jesu nomine, quæ a vobis defenſum iri, confiditis; atque ſellæ, huic negotio apparatæ, inſidens, dnum. chirurgum, de officio ſuo intrepide exequendo cohortabatur: opus igitur aggreſſi ſumus, atque ſecundum et majus trepanum fuit applicatum, cum ſucceſſu optimo, et ſumma ægri tolerantia, qui nec de ullis conquerebatur doloribus ſolito; tamen major quantitas ſanguinis, per ipſum trepanum, cum ad diploen deventum eſſet, ad cochlearia tria vel quatuor circiter, ſubſequebatur; ipſum os exſciſſum vero, firmum ac ſanum, ac valde craſſum, niſi quod aliquo modo, in inferiori tantum lamina, ut monſtrat, carie arroſum eſſet, reperiebatur: ipſum trepani foramen, floridus adimplebat ſanguis, cui linteolum, oleo roſaceo imbutum, atque ſtupa, quantum ſufficiebat, imponebantur.

tions ſteadily and manfully. The work was begun; a ſecond and larger trepan-crown was applied, with little pain to the patient, but with an unuſual profuſion of blood, (which began to flow when the ſaw had reached the diploe), to the extent, indeed, of three or four ſpoonfuls. This piece of bone was firm and ſound, and peculiarly thick, except on its lower ſurface, where it ſeemed eroded by caries. But a pain in the eye of that ſide, which, from the time the perforation was half finiſhed, the patient felt at every turn of the ſaw, forbade the application of a third trepan. He himſelf requeſted that no other perforation ſhould be made at this time; and we accordingly left him undiſturbed. He dined but poorly, from want of ſtrength; at two we met again, to make the third perforation, but refrained from it on account of the pains, which were rather aggravated than relieved. He went to bed ſupperleſs, paſſed an uneaſy night, and it was only towards morning that he had any remiſſion of pain.

" But, on the 24th, the third trepanning was very happily and ſucceſsfully performed; the bleeding from the diploe was equally profuſe; the patient felt no pain from cutting the bone; but the pains of both eyes came on again, from the working of the terebra, and ceaſed the moment the piece was cut out. This piece of bone was in no degree tainted with caries, but ſound without and within. The patient was full of hope and confidence, and doubted nothing that his perfect recovery, and the ſucceſs of our operation, would give the lie to our detractors. He

Ad tertium trepanum progredi, vetabat dolor oculi iſtius lateris, nempe ſiniſtri, quem ſub ipſa terebratione fere dimidia, et ad ſingulas quoque trepani adactiones, dn. æger perſentiebat; tum et, quod differri illud ſi foret poſſibile, ipſe poſtularet, quia ſe viribus ad aliud ex alio ſubſequens, perferendum, imparem futurum putabat; facta itaque beligatione convenienti, inturbatus relinquebatur. Prandium, ob appetitum proſtratum, fuit exiguum. Hora ſecunda promeridiana, ad inſtituendum trepanum tertium conveneramus, quoniam autem dolores oculum vehementiores invaſerant, qui necdum intermittebant, ſed ad qualemcumque; in facto modo foramine, preſſionem, augmentabantur, in craſtinum illud differre, conſultum videbatur: reſoluta faſcia, ſcrobiculus trepani, fluido ſimul et florido ſanguine plenus, inveniebatur, facta itaque debita deligatione, præter quod aliud quid occiperetur, die hac dn. æger ſinebatur; manſit incœnatus, et noctem traduxit inſomnem, quod ingraveſcentibus oculi ſiniſtri infeſtaretur doloribus, qui circa tempus matutinum aliquantum remiſerant.

Die 24. Cum ſucceſſu optimo inſtituebatur trepanifatio tertia; ſanguinis tamen, pari ut in ſecunda, ubi ad diploen perveniebatur, ſubſequente quantitate, conſtanter pariter hanc ut antecedentem, et ſine magnis doloribus dn. patiens preferebat; ſub ipſa terebratione tamen, dolores in utroque oculo incidenter affligebant, qui tamen ſtatim, cum operationis ſine quoque finiebantur; gratulabatur ſibi de ſucceſſu bono dn. patiens, ſpe ſubſecuturæ felicis curationis fretus, hinc dextra ſua, meam, ſub ipſa terebratione, prehendens et premens, bene negotium, ad me inquiebat, Deo auxiliante, ceſſurum, et obtrectatoribus noſtris probo futurum, confido: " Ich mercke, es wird durch Gottes Hulffe gut gehen, allen unſern Feinden zu Spott und Schande." Peracta trepanatione, modo

went ſupperleſs to bed, ſpent a painful and fatiguing night, and towards morning was thirſty.

" He requeſted, on the 25th, that we ſhould defer for two days the ſawing out what remained to be cut away: Excepting occaſional lancing-pains in the forehead, he continued well, ate with appetite, and had refreſhing ſleep. On the 26th, the pains of the eyes and forehead returned; and, having ſupped plentifully, he paſſed a ſleepleſs night, but free from pain. On the 27th, ſome of the intermediate pieces of bone were cut out with ſtraight ſaws, ſome fragments were pinched away with the cutting forceps. On the 28th, a ſaw better adapted to the form of the part having been prepared, more bone was ſawed away; drying applications were put to the fungus; his appetite improved; he was chearful; he had a tranquil night, and ſlept a good deal. On the 30th, the ſaws were uſed once more; however lightly

debito deligabatur. Oſſiculum exemptum, nulla carie infectum, ſed lamina ſua tam exteriore quam interiore ſolidum, omnibuſque partibus incorruptum deprehendebatur. Prandium fuit modicum: poſt meridiem, de aliquali ſolum virium imbecillitate conquerebatur; cœna fuit brevis, vel nulla potius; noctem habuit inſomnem, ob dolores, in foramine præprimis ultimi trepani, et circa frontem, perceptos fere continuos; circa noctem mediam circiter quoque ſiti vexatus, adeo ut de decocta ſumere fuerit neceſſitatus.

Die 25. Ut ad biduí ſpatium, in exſcindendo reliquo oſſe, ceſſaremus, petiit, quo tempore vires ſe recuperaturum, ſibi habebat perſuaſiſſimum, quare, deligatione tantumdem facta, quieti relinquebatur; ante prandium ad ſeſquí horæ ſpatium dormivit, ceſſarunt pridie allapſi dolores, et prandit ſatis bene; poſt meridiem ſatis erat vegetus, niſi quod bis terve circa frontem imprimis, pungentes, mox tamen evaneſcentes, perciperet dolores; cœnavit ſatis bene, noctem habuit quietam, nec ullos capitis dolores ſenſit.

Die 26. Mane, capitis dolores, ad oculos et frontem imprimis ingruentes, non tamen diu, (dimidiam horam circiter), durantes obſervabantur; facta fuit deligatio, poſt etiam ſatis bene pranſus fuit. Cœnavit largiter, noctem vero inſomnem fere, ſine ullo tamen capitis dolore, peregit. Operationibus his abſolutis, ſeorſum collocutus mecum dn. patiens, ſe, reliquos dnos. D. D. excepto Dn. Lic. Gottſched, medico tunc ſuo ordinario, abdicaturum, mihi expoſuit, voluitque ut de meo conſilio, reliqua perficeretur curatio, utque ad finem uſque huic præeſſem, a me popoſcit.

Die 27. Serrulis rectis, interſtitia foraminum, modiolis factorum, diſcindere tentebatur, ob ſerrularum autem ineptitudinem, duæ tantum lineæ, ſeu delineationes, pro inſtituendis ſectionibus, accommodiſſima, ductæ fuerunt, leviter tulit omnia dn. patiens, poſt vero, ante prandium, iterum per ſemi horam, ad oculos, capitis ſenſit dolores, pranſus tamen eſt ſatis bene; poſt meridiem bona fuerunt cuncta, ad horam quartam uſque, ubi forcipe inciſoria aliquot fruſtula oſſis, inter primi et ſecundi trepani foramina, exempta, foramina item exterſa, et deligatio facta fuerunt; cœnavit bene, et ſine dolore, cum aliquali ſomno, noctem traduxit.

Die 28. Tam ante, quam poſt meridiem, nihil fere, ob ſerrularum commodarum defectum, præter deligationes, inſtitutum fuit; interim ſatis bene ſe habuit, ſatis bene comedit, atque bene dormiendo, poſtquam ad horam nonam uſque nocturnam, ab amicis et cognatis, ſecum cœnantibus, blandis converſationibus exhilaratus eſſet, ſine dolore, quietam habuit noctem.

Die 30. Serrula iterum adhibita fuit, atque ubi interior quoque lamina perfecta videbatur, quamvis cohæreret

the dura mater was touched with the levators or ſaws, it ſeemed extremely ſenſible, and excited excruciating pains; many parts were now burſt up with the levators, which were carious on both ſurfaces, and throughout. That part of the fungus which protruded through the openings of the parietal bones, was cut off with a blunt ſpathula, without the ſlighteſt perception of pain, while part of the cranium on the right ſide was burſt up with the levator, which, though ſound without, was carious on its internal ſurface: Part of this ſurface yet adhered ſo firmly to the fungus, that, in place of being ſeparated, it was cut away with the forceps, which excited excruciating pains of the eyes, and through all the brain, ſo terrible, indeed, that the patient, who had borne all the moſt painful parts of the operation with compoſure, roared with agony, "Oh, oh, my left eye! in the name of God, what are you doing?" while the blood flowed very profuſely; all that day he ſuffered dreadful pain, but his ſleep was ſweet and refreſhing, without diſturbed dreams. On the 31ſt, the pains returned at dreſſing; two days he paſſed in great fear of hemorrhagy, almoſt depriving himſelf of ſleep. On the 2d of October, the veſſel which had occaſioned this alarm was tied; and this day, as on many of the preceding, he was ſtill tormented with a gnawing pain, (dolorem quodammodo mordicantem); but it ſubſided as uſual towards night, and he enjoyed refreſhing ſleep. On the 5th, a ſmall fragment of the fungus was ſeparated with a ſpathula. On the 6th, it became neceſſary, on account of profuſion of matter, and a degree of fætor, to dreſs twice a-day.

adhuc, vectis per primum trepanum parti ſiniſtræ, ſuper fungo, ſubmittebatur, (ſimulac enim extra fungum, dura mater in ſecundi aut tertii trepani foramine, quam leviſſime tangebatur, intolerabiles excitabantur dolores), ſurſumque pars illa, ad futuram ſagittalem uſque effringebatur, quæ, qua faſciem exteriorem, et interiorem, carioſa plane invenicbatur; poſtea, fungi, quæ per ſagittalem excreverat pars, ſine ulla doloris perceptione, et ſpatula quidem, ſeu ferro hebete, ſeparabatur: pariter et dextra calvariæ pars, vecte elevabatur, quæ extrinſecus, integra, intrinſecus, magna ex parte carie deroſa ſpectabatur, interiori etiam ſua lamina, fungo tam firmiter adnata erat, ut erui non poſſet, et forſice abſcindi eam oporteret, unde dolores acerbiſſimi, et in toto cerebro, et ad oculos imprimis, induccbantur, ut etiam dn. æger, (qui alias dolores quoſcumque per operationes cunctas, inſenſibilis quaſi pertulerat), exclamare cogeretur, ("Ave, ave, mein linckes Auge umb Gottes Willen, ihr Herren, was macht ihr?") Ah, ah, ſiniſtrum meum oculum, per Deum, Domini, quid agitis? ſanguis etiam, ob ſeparationem illam, large profluebat, quare immiſſo prius decocto ſculteti, faſcia imponebatur, atque quo ſanguinis fluxus ſupprimeretur, hac die non ſolvebatur, ſed circa veſperam defenſivum reiterabatur; ſenſit eo tempore immanes, quales toto quatuordecim dierum ſpatio non afflixere, dolores, quid ad noctem uſque, donec ſomnus ingrueret, pendurarunt, quapropter cœna etiam modica tantum fuit; ſubſecutus tamen eſt ſomnus bonus et reficiens, abſque ullis imaginibus aut inſomniis; unde mane,

" The opening was now more accurately meafured with compaffes; it was of a triangular form, and fully three inches in length. On the 7th, fome fmall fplinters of bone feparated at the dreffing; other fmaller exfoliations were difcharged at the dreffing of the 9th; on the 10th, two more were difcharged; and on the 11th, two more from the fore-part of the opening; on the 12th, was difcharged a larger fragment; on the 13th, he had pains of the eyes and temples, which only ceafed after an hour's fleep; and on the 14th, one other fcale was exfoliated. On the 17th, towards night the pains returned, which kept him awake till midnight. On the 18th, he went to vifit fome friends, and remained till midnight; he paffed the day without pain, and the following night in refrefhing fleep. He was now dreffed with dry dreffings only. On the 20th, ftill, another fcale of bone came away; on the 21ft, he had his fifters and friends to dine with him. The granulations were now feen rifing faft in the firft trepan-hole, and an exfoliating piece of bone was pulled away with the forceps.

" But of leffer exfoliations, laxative pills, anodyne draughts, and refrefhing or fleeplefs nights, there is no end in this narrative, as there are no bounds to the encomiums of the patient's conftancy and fortitude, nor any moderate limits to the auguft titles which the noble patient, and all his relations and friends, collateral and direct, barons and baroneffes, are decorated. I muft conclude with faying, that, on account of the foftnefs and apparent fungofity of the growing flefh, they were obliged to touch it occafionally with cauftics. During all the month of December,

Die 31. Satis alacer reperiebatur, facta fuit confueta hora 8va deligatio, præmiffa inunctione decocti fculteti: poft deligationem, non leves iterum illapfi funt dolores, ad prandium ufque, durantes, qui tamen intra prandendum, quo cibus, in fatis magna quantitate acceptus fuit, evanuerunt, ita ut horis promeridianis, dnum. ægrotum fatis vegetum invenerimus: ad vefperam, iterum capitis dolores perfenfit, ad fomnum ufque affligentes, unde cœna exigua, et fomnus interturbatus fubfecutus; nocte in media, fatis vehemens, exorta fuit hæmorrhagia, ut pro coercenda ea, dn. Fuchs chirurgus, qui iifdem in ædibus commorabatur, fuerit accerfitus.

Die 1. Novembris, foluta ligatura, ad finem ultimæ incifionis, in finiftro latere, fub incifione, diffecta prominens vena hunc effudiffe fanguinem, reperiebatur, quod tamen, ab ipfa incifionis die, nondum contigerat: impediebat hæmorrhagia hæc, quo minus apertura debite extergeri poffet, et carptis filamentis obturari poftulabat, facta itaque fuit cita deligatio, prandium habuit mediocre, aliquales tamen, non adeo vehementes vero, capitis dolores fenfit, cum aliqua virium imbecillitate: poft vefpertinam quartam, inftituebatur deligatio, finiftro tamen latere relicto intacto, ob hæmorrhagiæ metum, adhibendo decoctum fculteti; cœna fuit mediocris, fubfequentem etiam vefperam et noctem fine doloribus tranfegit, fomnolentus quidem, fomno tamen fe non dedit, ob hæmorrhagiæ metum, quia caput finiftrorfum lecto imponere metuebat, donec primo diluculo, fuadente chirurgo Fuchfio, (qui, capite infpecto, nullum crupiffe fanguinem invenerat, in finiftrum latus fe inclinaret, et fub ejus cuftodia bene dormiret.

the progreſs of the wound was regular, and his re-convaleſcence was uniform and rapid. He had only one reſtleſs night, that of the 7th, and it was occaſioned, not by his own ill health, but by his anxiety for a friend, who, upon ſeeing the wound at one of the dreſſings, was ſtruck with horror, fainted, and fell back. He ſuffered no interruptions, but what were occaſioned by ſlight imprudences; nor any diſtreſs, but from a violent cough, occaſioned by late viſits to the baroneſſes and barons. On the 17th, he took an airing for ſome miles in a cloſe carriage; one ſmall ſcale was diſcharged on the 20th. The laſt of December, the day of his final cure, and the laſt of the year, he ſpent with becoming ſerioufneſs, in religious duties, in giving thanks to God for his miraculous recovery; the next he ſpent in the feſtivities of the ſeaſon without reſtraint, and without harm; and, having returned home on the 30th of January, continued to enjoy the moſt perfect health."

I have tranſlated thus, faithfully, a caſe which has often been the ſubject of comments, a caſe much miſunderſtood, that being deſcribed as a fungus, which is plainly a caries of the ſcull. This long and intereſting narrative carries with it very important pathological facts. It is a caſe ſolitary almoſt in the records of our ſcience, and the ſucceſs of theſe rude but neceſſary operations, in which a ſpace of ſix inches circumference was cut out of the ſcull moſt fortunate. You will have remarked, as I deſcribed in ſucceſſion to you, the ſeveral phenomena, —the extreme cold, ſucceeded by immediate heat,—the ſudden pain,—the ſlow progreſs of the diſeaſe,—the extent of the caries,—and the inſignificancy of the fungus. I am not ſorry to have tranſlated, for the firſt time, this narration from the Gothic

Die 2. Facta fuit deligatio, impoſito venæ in ſiniſtro latere, (quæ tamen nullum ſtillaverat ſanguinem), pulvere ſtyptico: malum alias in eodem inventum fuit ſtatu, niſi quod ſupra denudatum os frontis; et in ſecundo tertioque trepano, rubicunda puncta, (novæ recreſcentis carnis primordia), ſparſim conſpicerentur: prandium habuit largum, totaque die bene ſe habuit, veſpere ingruente tamen, in ipſo malo, quodammodo mordicantem ſenſit dolorem; cœnavit mediocriter, et quietam, ſine doloribus, habuit noctem.

Die 3. Sine doloribus, alacer, totam peregit diem, probe prandendo ac cœnando. Mane, et ſic unica tantum vice, die hac, recenſito jam modo, fuit facta deligatio, (funda galeni dicta), noctem, bene dormiendo, tranſegit, licet etiam aliquoties expergiſceretur, ſtatim tamen iterum obdormivit.

Die 4. Tota die, cuncta bene geſta, præterquam quod poſt deligationem, per horæ fere ſpatium, dolores capitis non adeo leves, ſenſerit: una facta deligatio; per tuſſim aliquoties a ſomno, qui ſatis quietus fuerat expergefactus.

Die 5. Modo priſtino et tempore conſueto, facta fuit deligatio; fruſtulum etiam fungi, obtuſo quidem inſtrumento, ſpatula nempe, ſeparabatur, quo facto, ſanguis ſtatim profluebat, et doloribus, levibus ſaltem, iiſque paucis, ad oculos decumbentibus, afficiebatur: alias omnia bona, niſi quod tuſſis continuaret. Circino obſervavi longitudinem interſtitii extremarum orarum, primi et ſecundi trepani ſignatam.

Latin in which it is told; it is a caſe of caries in the ſcull, as nearly parallel with that of the boy's tibia, proceeding from cold, as can be imagined, and well calculated to demonſtrate the ſudden effects of cold ſeconded by heat and fever upon the ſtructure of a bone.

Firſt, a ſtrong and vigorous man, travels poſt by night, in weather intenſely cold, and though inured to ſervice, in Brabant, with the army, he feels all its intenſity, and aſcribes to it all his diſtreſs. He arrives at his houſe, and is received in rooms heated, after the German manner, with ſtoves; and there having hardly embraced his friends, he is ſtruck with a ſudden and violent pain in the head; and, I doubt not, had the detail of his caſe been very perfect, we ſhould have found, that, like this herd-boy, he had paſſed the firſt night in feveriſh dreams, and great diſorder. During ſeven weeks, the pains are unremitting and torturing; and while the bone was thus inflamed, ſurely the dura mater could not fail to ſeparate from it; the moment the pains ceaſe, the vertigo is perceived, which marks the exact period of this kind of danger. The pains return, his whole ſcalp ſwells, and then by ſuppuration the ſwelling becomes limited to the part affected, to the region of the carious bone. Again, at the diſtance of fourteen days, the puffy tumor riſes;—the ſcalp is plainly detached from the deadened cranium;—the tumor ſubſides, but the ſore never heals;—the bone, covered by fiſtulous integuments, diſtils a ſerous humour; and we have every reaſon to believe, that when the integuments are no longer able to hold connection with ſuch diſeaſed bone, the dura mater, on its internal ſurface, cannot remain ſound. This caries, then, or febrile necroſis of the ſcull, is plainly the original diſeaſe: The ſeparated dura mater might well put on (in this ſeparated ſtate) a diſpoſition to generate fungus: Yet, when, after a year's ſuffering, and innumerable conſultations, the phyſicians and ſurgeons reſolved that the trepan ſhould be applied, when a great circle, of ſix inches of circumference, is cut away, there is, in proportion to this extent of caries, a fungus ſo inſignificant, that except ſome ſlight aſtringents, ſoaked in Malmſy wine, and (towards the end of the cure) ſome ſlight applications of the cauſtic, we hear nothing of the fungus; it is adventitious only; it does not protrude through the ſcull, nor, though cut down, does it grow up again like a true fungus, in one night; it wants every eſſential character of fungus; it reſembles nearly the vigorous granulations of a healthy but ſuppurated dura mater; and heals ſo equally along with the bone and integuments, that we are no more entitled to deſcribe this as a fungus of the dura mater, than as cancer of the brain.

OF SUPPURATION OF THE BRAIN, FROM WHATSOEVER CAUSE IT PROCEEDS, WHETHER FROM LACERATION OF THE INTEGUMENTS, SEPARATION OF THE DURA MATER, OR CONTUSION OF THE SCULL,—OF THE SIGNS OF DANGER, AND THE PROPER TIME FOR OPERATING,—WITH AN ANALYSIS OF THE OPINIONS AND PRACTICES OF THE MOST ABLE PHYSICIANS AND SURGEONS ON THIS IMPORTANT QUESTION.

You will now perceive, that contusions of the cranium lead naturally to one of two forms of disease; either to a mere exfoliation, a disease limited to the bone, and long protracted, yet in no period void of danger; or a present affection of the dura mater, penetrating in a few days to the brain itself, and followed by very sudden death. If, in demonstrating to you the various affections of the lacerated scull, separated dura mater, and contused bone, I have treated individually and distinctly of affections which are oftener combined, it is with the purpose, first, of proving, that they do happen independently of one another; and, secondly, of accustoming you to reason correctly on the individual facts; and teaching you to distinguish the peculiar constitutions and affections of each part, so as to be able to foretell the dangers resulting from each particular injury. But these parts having one common circulation, and a mutual sympathy and dependence, it cannot be but that, in most cases, the blow which affects the bone, by contusion, must shake the dura mater, and deaden the integuments, and produce, by this complicated injury, symptoms different in complexion, (and more immediate in their consequences), from any I have yet described. I have described chiefly that form of contusion, where, along with a mere caries, there is a slow separation of the corrupted bone, and little danger; but not that where the period is short, where the symptoms immediately follow the injury; where, though there is no external wound, nor apparent bruise, to intimate the patient's danger, there rises, after a few days of shiverings, and indescribable confusion of head, a puffy tumor, the sureft mark of danger, and where in a few days more the brain is deeply affected, and the patient dies. I am now to explain to you the principles on which this case is to be resolved, the rules and data, according to which a consultation, the most solemn and interesting in our profession, is to be conducted: The confusion of head, shivering, and fever, are all too slight for the patient to feel, or his friends to apprehend, or any but his surgeon to estimate justly the danger of his situation: The symptoms are too slight to allow the mention of an operation, esteemed the most hazardous in surgery, which yet must be imme-

diately performed, elſe the man is loſt without redemption. Not one among you, perhaps, is deſtined ever once in his life to perform lithotomy, but there is not one of you who will not be daily called upon, in future practice, to decide upon the moſt difficult of all queſtions reſpecting injuries of the head;—to deliver before a jury a ſentence on life or death;—to proclaim the motives and principles of your practice, your reputation being involved in the fate both of your patient, and of the criminal accuſed of his death. The phenomena which I have hitherto deſcribed, are chiefly thoſe of caries, affecting only the bone, protracted for months or years, and often void of danger. But the train of ſymptoms I am now to deſcribe, are thoſe from which danger is inſeparable.

A man, in a quarrel, or in a riot, is knocked down with a brick-bat, or bludgeon. He is, perhaps, only ſtunned by the blow, and does not fall down: he is ſickened, faint, cold, and pale, but in a few minutes he feels quite recovered: often a blow apparently more terrible, is harmleſs: but whatever may be the force, there is unhappily no criterion of the effect of ſuch a blow. Though a patient thus hurt is apparently well, and goes about his uſual occupations, he feels a depreſſion of ſpirits, and a confuſion of head,—a want of appetite, and loathing of food: He is in a faint, languid, and nervous condition: his hands tremble, and his head ſwims upon being hurried in exerciſe, or diſturbed with any unuſual emotion, and he paſſes the night in unquiet ſleep, and terrifying dreams, from which he wakes in indeſcribable confuſion, from time to time. In a few days, the part injured, though at firſt it was hardly livid, riſes into a puffy tumor, round, ſoft, regular, circumſcribed; important, only as it is connected with theſe ſigns of danger, and as it implies a detachment of the dura mater, and contuſion of the bone.

In a few days, the fever is more conſpicuous, (though perhaps the tumor is flattened), with ſlight horrors and ſhiverings; the confuſion is more diſtreſſing, attended with pain, and a ſenſe of girding in the head; he can no longer endure the light; the eyes are red, ſwollen, and gummy, (the oculi ſubpingues of the ancients); the pulſe is quick and weak; the tongue foul; the ſkin parched; the viſage pale and ghaſtly, with a hectic flush upon the cheek; the urine pale, and ſparing in quantity; the hands, and the tongue, when he puts it out, tremble. He knows not what ails him, but is night and day in a ſtate of indeſcribable confuſion. During the night, roving, grinding the teeth, and ſlightly delirious; and during the day, deſponding, oppreſſed, and ſick.

If the ſurgeon be fully aware of the import of theſe ſlight, but alarming ſigns, he opens this puffy tumor with the ſcalpel, and finds the bone dry, and whitiſh, or inclining to yellow. He knows by the aſpect of the pores, which are the holes by which the arteries enter it, that it is dead. He applies the trepan, and upon taking out the piece, finds that there is a ſlight coating of cream-coloured pus upon the dura mater, and congratulates himſelf, not without reaſon, on having anticipated the danger, and ſaved his patient's life; for uſually the ſymptoms ſubſide after perforation, the dura mater reddens, granulates, and heals along with the ſcalp, with which it unites in one common cicatrix.

But, if the patient be regardleſs of theſe ſymptoms, unconſcious of his ſituation, or indifferent to the intreaties of his ſurgeon; if any how this happy interval be neglected, the ulcer, which was in this ſtage confined to the dura mater, extends to the brain. The confuſion of head, and fever, increaſe; the patient becomes ſtupid, and drowſy, and weakens from ſleep in great confuſion and alarm. He has longer ſhiverings, and more continual ſickneſs; his knees totter under him, his hands tremble, and his face is often ſlightly diſtorted with ſpaſms; and his limbs, eſpecially of one ſide, are often ſlightly convulſed; and growing gradually weaker, he ſometimes becomes paralytic of one ſide, but uſually becomes only more ſtupid, and oppreſſed, and ſuffers ſlight convulſive paroxyſms before he dies. During the firſt eight or ten days, he is in this ſtate of languor and ſickneſs; from the tenth to the twentieth, he is in manifeſt danger; and uſually before the twentieth or twenty-fifth day, he expires.

The nature of this puffy tumor, and the ſad preſages to be drawn from it, are now plain to you. The blow which contuſes the bone, deadens the ſcalp, and that ſurface which is next the cranium, is chiefly affected, in conſequence of the hard reſiſtance of the bone: The ſurface of the ſcalp, in contact with the contuſed ſcull, is gangrenous, and thence the tumor is enphyſmatous, ſoft, uninflamed: The deadened part being limited, gives a circular form to the tumor; by the extravaſation of blood, and inflammatory thickening of the ſurrounding parts, it is circumſcribed; and by its relation to the contuſion of the bone, and the probable ſeparation of the dura mater, ſuch tumor becomes the moſt infallible ſign of danger. Nor is it to be doubted, that ſuch puffy tumor ariſes from the contuſion of the bone, and the bruiſing of the ſcalp; for the ſeparation of the dura mater will not cauſe it. Often have I ſeen the patient, who had great effuſions of blood betwixt the ſcull and dura mater, lie for days or weeks oppreſſed and unaſſiſted; but never have I ſeen ſuch ſeparation of the dura

mater marked with puffy tumor. I have here deſcribed the moſt common courſe of the proceſs, which uſually laſts fifteen or twenty days before it affects the brain, and is ſo uniformly the conſequence of contuſion, as to make the examples I have lately laid before you, of ſymptoms delayed for months, mere exceptions to the general law. The uſual inference, though not univerſally, is generally true, " That the danger ariſing from contuſion, or wounds of the head, muſt appear before the fortieth day." The rules which nature points out for our conduct are ſo very plain, that, had nothing been written on the ſubject, I had found little now to write. But every doubt muſt be removed from your minds, and your direct line of conduct aſcertained by authority, as well as pointed out by reaſon. If there be a caſe which the ancients underſtood, it was this of ſuppuration of the brain, proceeding from a contuſed bone. From the nature of their arms in fighting hand to hand, from the partial warfare of innumerable rival ſtates concentrated in a narrow peninſula, they had ſo many opportunities of obſerving the ſtages by which a blow becomes fatal, that all the circumſtances of the contuſed bone, ſhiverings, fever, and other ill ſigns, were perfectly underſtood; and long before books of ſcience were written, or opinions and ſyſtems began to be perplexed, Hippocrates had announced, in the form of a ſimple aphoriſm, thoſe facts which we labour, through many pages, to prove, and find it difficult to bring back to the ſimple truth. " When the cranium, (ſays Hippocrates), fractured, contuſed, or otherwiſe injured, is neglected, and neither raſped on its ſurface, nor perforated, as needing no ſuch care, the fever appears in ſummer on the 7th, though not in winter till the 14th day. Thus, the bone ulcerates, changes its colour, and diſcharges a thin ſanies; and, being inflamed, it naturally periſhes, becomes yellow or livid, as if ſoaked in brine; and when it becomes thoroughly corrupted, grows firſt intenſely black, and then white again. Some, having gangrene of the brain, periſh in ſummer on the 7th, in winter by the 14th day. Wherefore, when you perceive the acceſſion of this fever, accompanied with other threatening ſigns, you muſt make no delay, but either ſcrape the ſurface, or perforate the bone through to the dura mater *."

* " Quum quis os fractum, aut ruptum, aut contuſum, aut quocunque modo fractum intelligens, per errorem deliquerit, et neque raſerit, neque perforaverit, veluti os non opus habeat, et velut os ſanum exiſtat; ante decimum quartum diem febris corripiet ut plurimum in hyeme. In æſtate vero poſt ſeptimum diem febris corripit; et poſtquam hoc factum fuerit, ulcus colorem amittit, et ex ipſo ſanies pauca fluit; et quod inflammatum eſt ex ipſo emoritur, et viſcoſum fit, et apparet velut falſamentum, colore fulvum, ſublividum, et os tunc corrumpi incipit, et fit valde nigrum, poſtremum pallidum aut valde album evadens.

Archigenes defcribes in like terms the condition of thofe who have the dura mater inflamed: "Ex læfis membranis apparet, ideo, enim febres cum horrore accedunt, faciei rubor, et calor longe major, quam pro febris modo, fomnique tumultuofi, oculi fubpingues, et gramiofi, et rubentes; ulcus neque alitur, neque pus maturat, et fordidum fit. Nonnullis et in lingua puftula oboritur. HIS UBI CITO MANUS ADMOVEATUR, SPES ALIQUA SUBEST SALUTIS, UBI SERIUS PLERIQUE OMNES MORIUNTUR." "When the dura mater is inflamed, then come fhiverings, and fever, and flufhings of the face, quite difproportioned to the degree of fever; difturbed fleep; eyes heavy, fwelled, and gory; a fore, flabby, and foul, with ill-digefted pus; fometimes puftules cover the tongue. *Thofe who are fpeedily affifted have fome chance of fafety; but when help is even but a little delayed, they almoft always die.*"

Thefe confequences muft have been long obferved before they were recorded: thefe conclufions, fo very important in practical furgery, have ftood uncontroverted for three thoufand years. The various ftages of death in the fcull, are marked by the ancients with fimplicity and precifion, as becoming firft dry, then yellow, or livid; and when thoroughly corrupted, entirely black, or black verging again towards a dead whitenefs: thus we are led back to that found and judicious rule which I have delivered to you in the words of Fallopius: "Woe to the patient whofe furgeon waits for the blackening of the bone." In cafes of fracture, there may, indeed, be doubts: the danger is eventual, the operation merely preventative. Fracture may caufe a fuppuration of the brain and membranes at fome future period; but contufion is the difeafe itfelf, it is the actual fuppuration of the brain, announced by infallible figns. Of all the cafes in furgery, this is the leaft equivocal. Of thofe who have fractures of the fcull, many even in the moft alarming circumftances furvive unaffifted; but in contufion, followed by fuppuration, unlefs the fcull be perforated, unlefs the abfcefs be opened, all muft die.

Hippocrates refers, in all his cafes and reprefentations, to war and weapons; and fuggefts, with that fagacity for which he has been famous, that we fhould watch with peculiar care thofe who are ftruck with greater violence, and eftimate the danger of the contufion according to the force of the blow: "Rumpitur autem os

Sunt autem et qui fyderati fiunt, atque fic pereunt ante feptimum diem in æftate, aut decimum quartum in hyeme. Quapropter ubi intellexeris febrem invadere hominem, et ex aliis fignis aliquod ipfi accedere non cunctari oportet, fed os ufque ad membranum perforare, aut fcalpro raforio deradere."

et obſcuris fiſſuris et manifeſtis: et contunditur obſcuris contuſionibus: et intro ex ſua maxime cedit, quum alter ab altero ſauciatur, *de induſtria ſauciare volens:* aut quum *ex altiore loco* ſit jactus,—aut plagæ ictus, uter tandem fuerit, magis quam ex plano loco:—et ſi *contineat manu* telum, *ſive jaceat, ſive percutiat;* et ſi *fortiorem debilior vulnerat* *."

"T. a big groſs man, of about thirty years of age, was (upon I know not what quarrel, but I believe in defending a little boy who had been abuſed) knocked down with a brick-bat. The fellow who had abuſed the boy, and then revenged himſelf upon the innocent man who interpoſed, was notorious for his ſavage diſpoſitions, and for ſuch uncommon bodily ſtrength, as to leave no apology for his lifting any thing like a weapon. He lifted half a brick, and, ſtanding on a ſtair to which he had retreated, threw the brick with all his force, and hit T. on the head a blow which felled him to the ground. He lay very long inſenſible, for the ſpace of a day and a night, in his own houſe, ſo that had we ſeen him at this period, we might have apprehended ſome burſting of blood-veſſels, and extravaſation within; but he revived, recovered his ſenſes entirely, found the cut on his head very trivial, and would have returned to his trade, but for that indeſcribable ſickneſs and languor which hung about him, without any remarkable ſymptoms, to the hour of his death.

"Deep as the ulcer had penetrated into the brain, and early as the ſymptoms began in this man, they were all along very ſlight. He had hardly recovered from the inſenſibility, when the ſhiverings commenced. On the 3d day he had frequent fits of ſhivering, of a quarter of an hour's duration, followed by heat and thirſt. A purge (which I preſcribed on the 4th) of jalep, and muriate of mercury, operated ſmartly, and relieved the pains in his head. Next morning, I found the vertigo, headachs, and tinnitus aurium, almoſt gone, and he felt nothing but a degree of weakneſs, and languor, and diſturbed ſleep. On the 6th day, I found this giddineſs, languor, and pain, increaſed, but again relieved on the 7th, by the operation of a ſecond purge; and, on the 8th, he mentioned but ſlightly the pain of the head, and ſeemed chiefly diſtreſſed by the debility and languor. In this ſtate did I watch him carefully, the headachs being relieved, but the languor increaſing, till the 10th day, when, beſides the oppreſſion and languor, he felt ſickneſs,—an increaſe of the headachs,—long-continued chillneſs and horrors,—a degree of confuſion during the night; and he awakened, not as from a refreſhing ſleep, but oppreſſed in an unuſual degree, with a hot ſkin, and a fretful pulſe; and he had that degree of

* De Cap. Vuln. xii.

conſtipation which I know not whether to aſcribe, in ſuch caſes, to ſudden confinement after a ſtate of health, or to an incipient ſtate of paralyſis, which affects always, I obſerve, the viſcera, before it ſenſibly affects the limbs. By a repetition of the purge, his confuſion of head, and ſickly feelings, were again abated, and ſomething of chearfulneſs and content was viſible in his countenance. He remonſtrated ſtrongly againſt the cutting off of his hair, under pretext of the ill effects which he had always experienced from cutting his hair, which infallibly, he ſaid, produced headachs; but really, I believe, for fear of this being but a prelude (as it was indeed deſigned) to ſome operation.

"The ſmall wound was now puffy and livid; the adjacent ſkin began to be undermined, and the probe, when introduced, ran along ſome extent of naked bone. The pulſe had riſen beyond a hundred, the tongue was white, the belly ſtill coſtive, and the night of the 14th he paſſed in a ſleepleſs perturbed ſtate, ſucceeded in the morning with headach, a permanent ſenſe of coldneſs, ſenſibility to light, and that character, in his features, and in all his motions, of oppreſſion and extreme languor, which is inſeparable from a ſuppurating brain. An uninformed perſon would expect ſuppuration of the brain to be marked by convulſions or delirium, while one at all acquainted with ſuch ſcenes knows, that it is diſtinguiſhed only by extreme weakneſs, not by the violence, but by the total abſence of ſymptoms. The man knows not what ails him; the ſurgeon perceives his condition, but the patient hardly complains, unleſs it be of ſighing, oppreſſion, ſlight confuſion of head, ſhivering, with a feeling of coldneſs at the acceſſion of each febrile paroxyſm, and trembling of the hands, and tottering of the knees, when either his mind is alarmed, or he endeavours to exert his ſtrength.

"This man I had deſtined for the knife, conſcious that no earthly power could ſave him, if that ſuppuration was allowed to come to maturity, which was plainly begun. But he was reſerved for a different fate; for the natural courſe of rotation of the hoſpital having delivered him into other hands, I met him wandering in the cold ſtairs of the hoſpital, his eyes indeed open, but his ſenſes gone, at the moment he ſhould have been under the operation of trepan. On the 13th day, an inciſion had been made, ſo as to prolong the cut on his head, and expoſe the naked part of the ſcull, which was nearly on the top of the head, cloſe by the ſagittal ſuture. The bone was bare, and was known to be ſo for many days; but it was not ſuppoſed dead. The inciſion healed, or ſeemed at leaſt in a healing condition; and for his ſickneſs

effervefcing draughts were prefcribed. He continued, with flight variations of pulfe, countenance, and intellect, in the fame ailing condition, from the 13th to the 17th day; but his vomiting was now fevere; his rigors lafted fometimes half an hour; his complexion was wan; his features contracted and pinched; his eye heavy and melancholy; his fever increafed, and his pulfe beating 112; and though generally feeble, it was fometimes very ftrong: Even in the hour of vifit, his vomiting was fo inceffant, his fhiverings fo violent, and his pulfe at the fame moment fo weak and trembling, that it could not be felt. On the 18th, the confufion of head, the ringing of the ears, the fever and fhiverings, and all the marks of diforder, were fo much increafed, that the operation could be no longer delayed, but unhappily, the man was, by eighteen days of fuffering, reduced fo very low, that the chance of his being faved by it was indeed very flight. Upon perforating the fcull, a profufion of ripe pus flowed from the trepan-hole; and he was committed to bed, where he paffed an indifferent night. In the morning, though no fhiverings were reported, he was chill; and, in place of the oppreffed and dejected countenance which he had before operation, his looks were wild, and his pulfe extremely rapid.

" On the fecond day after the operation, the dura mater looked black and floughy, the difcharge fætid, the matter continued to flow profufely from the trepan-hole; yet his looks had changed again from wild and diftracted, to oppreffed and anxious; the fhiverings, he faid, had ceafed, becaufe he had refrained from cold drinks, but his head was fadly confufed. On the 3d day he fell lower; his fenfes were perfect, but his looks expreffed unfpeakable diftrefs: the matter was brown, thin, and fætid, the wound dry and glazed, the fkin hot, and the pulfe feeble and quick, and the breathing oppreffed: without having fhiverings, he had frequent chillnefs; with lefs feeling of pain in the head, he has a miferable feeling in every part of his body. By the 4th day, he had fallen extremely low; the univerfal uneafinefs feemed very diftreffing; his pulfe extremely weak; his voice feeble; his features fhrunk; he never flept, but moaned and toffed continually. On the evening of the 5th day, after a fevere fhivering, he fweated profufely; his features fhrunk perceptibly, his pulfe was extremely quick, his extremities cold; the night was paffed in great diforder; he ftruggled to get out of bed, and towards morning fell low, and expired."

The affidavit which I prefented on this occafion to the magiftrates, I have unfortunately loft. But in this cafe, I have given a faithful picture of a condition of

the ſyſtem which I have often obſerved and watched, from the ſlighteſt glimmerings of danger, to the laſt fatal ſtruggle of delirium or convulſive tremors. By this inſtructive caſe, you are taught at once the ſlightneſs of the ſymptoms, —the danger inſeparable from theſe phenomena of ſhiverings and puffy tumor combined,—the deadly ſuppuration that infallibly lurks under a dry and diſcoloured piece of cranium,—the folly of delaying, till deadened bone degenerates actually into black caries! and you are now conſcious, that though the fate of the patient is terrible, the ſymptoms are not ſo: that the moſt deadly and deciſive are, debility, anxiety, ſhiverings, and ſlight confuſion of head: that to wait for ſymptoms is to wait for death, for the firſt ſlight convulſion, or decided delirium, is the immediate forerunner of death.

The caſe I am now about to lay before you, is of a very different complexion. "Elizabeth Barrow, a woman of the moſt diſſolute life and manners, about thirty years of age, was knocked down in the dark, in a drunken tumult, with a candle-ſtick, poker, or ſome ſuch weapon, but immediately recovered her ſenſes, and continued in health.

"The blow ſhe had received was near the vertex, upon the corner of the parietal bone, and not far from the ſagittal ſuture; and there roſe over the contuſed part a circular tumor, not exactly a puffy tumor, but rather aneuriſmal, containing blood. For ſix weeks the tumor was ſtationary, and the woman, though weakly, and having pains in the head, was without any formal complaint. Perhaps there is no greater mark of a diſſolute life, and vicious diſpoſitions, than a diſregard of health; and this woman ran her uſual courſe of vice and wickedneſs, undiſturbed with any thoughts concerning her health, till febrile paroxyſms and pains of the head forced her to apply to a ſurgeon, who opened the tumor, which was then of the ſize of a hen's egg, with the point of a lancet, and it diſcharged chiefly blood. But the puncture ſoon cloſed, matter gradually collected, and the tumor was ſoon of its original ſize. In a month more, it was again opened, and diſcharged blood mixed with matter, healed again, and again formed.

"The tumor was pointed, and about half the ſize of a tennis-ball, ſoft, puffy, and little elaſtic. The centre ſoft and fluctuating, the circumference hard, firm, and bulging; the bottom ſolid, and giving that very peculiar feeling, by which we are apt to be deceived, in recent extravaſations of blood; it felt as if the tumor covered a very remarkable depreſſion of the ſcull. Upon laying it open with free inciſions, the matter which flowed was thick and purulent,

much mixed with blood; one of the arteries of the ſcalp bled profuſely; the bone was felt rough and ſcabrous to a great extent, and from part of its ſurface a looſe fungous growth, ſo looſe that you could puſh the point of your finger through it, protruded into the cavity of the abſceſs. In theſe circumſtances, how to proceed was indeed a queſtion of delicacy. In a recent contuſion, with even the flighteſt of theſe ſymptoms, where there was, with occaſional ſhiverings, a naked bone at the bottom of a puffy abſceſs, the rule would have been expreſs. But this woman was in apparent health; much time had elapſed without any ſigns of danger; the bone might be carious merely on its external ſurface, and might exfoliate, or might granulate, (as indeed it did in the end granulate): There could be no apology for precipitate operation; there ſeemed to be time for reflection; the perforation of the cranium was accordingly deferred.

"But ſhe had been induced to preſent herſelf to the ſurgeons, from having headachs, ſometimes ſevere, with confuſion of head, chillneſs, and fever-fits, which were very diſtreſſing; ſhe was at the ſame time ſo nervous and alarmed, and her ſufferings altogether ſo great, that ſhe received with pleaſure the firſt propoſal of an operation. The catamenia, which had diſappeared after the blow, were now flowing, but were ſuddenly ſtopped with an increaſe of headach, a coſtive belly, a hot ſkin, and a febrile pulſe, counting always above 100. On the 4th day of putting herſelf under our care, the inciſions being already very free, the operation of trepan was performed by Mr Lawſon, who made his perforation near the ſagittal ſuture, and on the anterior part of the caries, through a very unuſual thickneſs of bone: but the bone was in part alive; a great profuſion of blood flowed from the cancelli; and the moment the inner table was divided, and before the perforation was complete, matter ſpouted up in great profuſion by the ſides of the ſaw.

"The night following the operation, the patient was reſtleſs and feveriſh, for, upon opening an abſceſs within the ſcull, as in opening one in any part of the body, the fever and nervous ſymptoms, hardly perceptible before, became very conſpicuous. Though the wound looked well, the head was in confuſion, and ſhe became extremely ſenſible to noiſe or light. The ſucceeding night was calm; and the headach, which was violent the firſt day, was relieved by reſt and quietneſs on the ſecond. The flow of matter from the ſurface of the dura mater was good and copious, and its ſurface began to granulate.

"Even on the 5th, I found her complaining of great depreſſion of ſpirits, nauſea, and ſickneſs, and great pain of the head; but, by the prudent uſe of glyſters

of opiates, and a little wine dashed with water, the sickness abated in two days, the wound contracted apace, the pus was thick and well-formed, the surface of the dura mater was vermeille and granulating. By the 8th day, the margins of the trepan-hole were red and fleshy, and the whole surface of the diseased scull was covered with a rich pile of granulations. In about twenty days more, the wound was contracted; the cicatrix of the scull, scalp, and dura mater, consolidated; and the woman perfectly cured in six weeks*."

Without any suggestion on my part, you will reap every advantage from the contrasting of this with the preceding case, and learn by experience the duty of watching with extreme solicitude the slightest changes of the eye, countenance, or pulse; the slightest shiverings, oppression, or sickness, in those who have this contusion of the scull. From what extreme danger this woman was saved, I need not, at this stage of our inquiry, represent to you;—the matter came up from betwixt the teeth of the trepan while working, and spouted from the orifice the moment that the sawed circle was poised up. O'Halloran says a thing at once untrue and discouraging; untrue at least as a general aphorism, and discouraging, since it tends to make us indifferent to the most interesting question in practice, and to the condition of many who might be saved: "In the course (says O'Halloran), of many years practice and careful observation, I cannot give myself credit for a single cure I ever performed in this way, (by trepanning), *when the symptoms of deposit were formed; for whether the patient was or was not trepanned, the scene closed with death.*" This does but prove the culpable delays even of this good practical surgeon, forewarned as he was of the dangers of matter being formed; and demonstrates to us, that those who die are lost by temporising and timid counsel; indeed we have some conspicuous proofs of that operation, which should have saved the patient, being unwisely relinquished after being successfully begun. "A boy, (says Slevogt), going to school, was struck with an unripe pear on the top of the head, fell down senseless, and was carried home, where he lay from morning to mid-day senseless, vomiting, and oppressed. When he recovered his senses, he pointed with his hand to the in-

* This woman, who made no secret of her vicious life, or syphilitic taints, had a new suppuration over the trepanned part of the scull nine months after the operation; the abscess was opened; a scale of bone exfoliated; and she had a mercurial course administered to her for the cure of very suspicious pains, accompanied with slight nodes on the clavicle and sternum.

jured part, and complained of pain ; and the common applications failing to diſcuſs the tumor, they called a ſurgeon, who, ſeeing the ſcalp entire, pronounced it a bruiſe of no moment, and without the ſlighteſt attention to diet or rules, applied firſt a gum-plaſter, and then, at the end of a fortnight, punctured it with a lancet, and let out ripe pus. At this time, all the ſymptoms of injured ſcull were diſtinguiſhable, pulſating pain, ſtupor, diſturbed ſleep, and loſs of appetite, with unceaſing pain ; yet had this man the preſumption to promiſe the parents, that the boy ſhould be well in eight days. But continually a thin ichor diſtilled from the puncture, and from a ſpontaneous opening near it, without the tumor at all ſubſiding, for it continued for five months, and at laſt the part became ſo exquiſitely ſenſible, that the little patient could not endure the ſlighteſt touch of the finger. After long diſappointments, and every ſhift to ſave themſelves the indignity of applying to a diſſatisfied relation, the parents of the boy were at laſt reluctantly forced to carry him to his uncle Daniel Mann, an experienced ſurgeon of Jena. Mann and Slevogt, upon examining in concert this carious fiſtula, found two ſmall orifices, each the ſize of a pea, from which the ichor iſſued in regular pulſations, correſponding with the pulſes of the brain. The whole ſcalp was raiſed in a puffy tumor over the meeting of the ſagittal and lambdoidal ſutures ; and when preſſed, ſo as to ſqueeze out the humour from theſe openings, the boy's cries were ſo piercing, that there was every reaſon to believe that the cranium was corrupted, and that it was neceſſary to open the ſcalp. Upon cutting off the hair, paſſing a probe, and making a crucial inciſion, a profuſion of black blood flowed out. On the day of the third dreſſing, a large portion of the outer table of the cranium was found looſe in the bottom of the wound, as thin as a ſheet of paper, and perforated like a ſieve ; and under this was ſeen the diploe naked, and the inner table perforated with one ſmall hole, through which a thin yellow ichor iſſued, bubbling up at each pulſation of the dura mater, (ex quo tenuis flaveſcens liquor, juxta rythmum vaſorum duræ matris pulſantium, expellebatur). Could there be a ſurer mark of things being wrong within the cranium ? There ſeemed to be in this caſe the moſt flattering proſpect of ſafety from the uſual and neceſſary operations, ſince the ulcer was not ill conditioned, nor the caries incurable, ſince the functions of the brain were in no degree affected, and gradually the ſleep, appetite, and ſpirits, were reſtored ; ſince he now moved his jaws eaſily, and ſuffered only from a tremendous cough, which had ſhaken his delicate frame for three weeks.

" But from the waywardneſs of the boy, united with his recollection of the firſt

incifions, they found him quite ungovernable. He ftruggled furiouſly at the flighteſt touch, and refifted even the ordinary dreffings, and thus difappointed them of all hopes. No flattery nor threats could p evail with the child to fubmit to what was fo neceffary for his fafety, and unfortunately the foolifh tendernefs of the parents now interpofed, and prevented even the appearance of an inftrument, faying, "they would rather have the boy dead than tormented."

"After a fatal delay, much of the corrupted cranium was at laft entirely difengaged, and through two large openings the dura mater was expofed naked, exhibiting at once three diftinct movements from pulfation of the arteries, from regular refpiration, and from the convulfive cough. But a new abfcefs formed towards the occiput; the ufe and benefit of inftruments was again refufed; the choice, indeed, was given the furgeons, of laying, if they pleafed, a cauftic on the part. But the boy became drowfy, the pulfe rofe, the appetite diminifhed, the ftrength gradually failed; he was feized with tremblings; he flept continually; the fever increafed; when fpoken to, he either did not reply, or anfwered wildly; and, after lying five days in this condition, he expired.

"The cranium was found perforated by four openings, and its inner table was eaten away by ulceration to a great extent, the dura mater coated with pus, and fwarming with little worms, while its arteries were, (efpecially where they approached the ulcerated parts), confpicuoufly turgid with blood; the brain, white in all the reft of its fubftance, was here of a rofy colour, with innumerable red points on its furface, and the ventricles full of a yellow ferum, which flowed out the moment the cavity was approached with the fcalpel."

Thus inftructed in your duties by direct examples, by experience and reafon, you are qualified to judge of authorities, and profit by criticifm, and are every way prepared for examining the practice and opinions of celebrated men, and to take an intereft in the general reafonings and dogmas of your profeffion, as you are deftined foon to take your part in particular cafes. The age of Morgagni was too remarkable in the annals of our fcience, and his epiftles too full of real knowledge, not to deferve every attention; it is therefore my defign to contraft his practice, and that of contemporary authors, with the celebrated furgeons of modern times, and, I truft, you are fo far initiated into the beft and foundeft principles of your profeffion, as to decide, the moment the cafes are laid before you, what fhould have been done for the hundreds of patients whom Morgagni and Valfalva fuffered to die without help.

" A young man, (ſays Morgagni), of ſixteen years of age, was ſtruck, with a ſtone which was thrown, in the left part of the ſinciput, near to the lambdoidal ſuture, at the diſtance of about two inches from the ſagittal. No ſymptom that was worthy of remark was the conſequence, except the lips of the wound beginning to ſwell, and that ſome days only before the eleventh day; on which day a fever diſcovered itſelf, with a coldneſs and a vomiting, but without any pain of the head. After this followed convulſive motions, ſpeechleſſneſs, deafneſs, and blindneſs; and, finally, in the beginning of the fourteenth day, death itſelf.

" The cranium was unhurt, and yet the dura mater, in that part which lay under the wound, for almoſt as large a ſpace as the wound was continued, was found to be thickened, and very lax, of an unequal ſurface, and of a colour verging to a yellowiſh hue; and betwixt this membrane and the pia mater, *a concocted pus was found to ſtagnate betwixt the falciform proceſs and the upper part of the cerebrum, which lay near thereto, quite to the anterior parts.* In the whole of the cerebrum itſelf, however, was found no injury which fell under the notice of the ſenſes."

" A woman, who had been for a long time ſubject to an epileptic diſorder, received a blow upon her head. In the beginning there was no ſymptom worth attention; ſo that, if ſhe were aſked about her complaints, ſhe anſwered that they were all very ſlight, or none at all. But at the end of ſome days, the ſymptoms began to ſhew themſelves, and to increaſe; the fever was augmented, and a certain ſtate of inactivity, which was very much like a conſtant ſleep, came on, though without ſleep; for if you attended to it, you heard her murmuring with a low and ſmall voice. And in this manner, neither the firſt remedies, nor the latter, being of any advantage, ſhe died.

" The ſcull not only ſhewed no fiſſure, but had ſcarcely any change of colour, in the part where the blow had been received: *Only under that place was a purulent mucus, as we have ſaid in the old man, though in a rather larger quantity.*"

" A man, who was near ſixty years of age, received a blow with a ſtick, a little above the extreme part of the forehead, and the left temple; *no morbid ſymptom appearing then, or on the following days,* ſo that he came by himſelf every day to the hoſpital of St Mary de Morte, at Bologna; where the uſual remedies were applied to his wound, which was ſuppoſed to be no more than cutaneous, and of no importance.

" And, indeed, *during four or five of theſe days, he continued in the market, ſelling cheſnuts, according to his uſual cuſtom,* in a very cold ſeaſon. But about

the ſixth day, his wound became worſe, and a fever, attended with a coldneſs and rigor, came on; *and this returning every day in the ſame manner, without any other ſymptom being added, than a ſlight gangrene of the wounded part, the man was gradually carried off thereby.*

" The carcaſe was contracted, as it ſeemed, from the coldneſs of the ſeaſon. A little ſanies had deſcended from the wound, betwixt the extreme margin of the temporal muſcle and the bone: and the gangrene, by its eroſion, had dilated the wound to the ſize of that piece of money which is called a Roman crown: and there the naked bone came into ſight.

" On cutting out the upper part of the cranium, *no ſign of injury could be obſerved in that bone*, even upon the moſt ſtrict examination. *Yet the meninges were found to be ſanious, and ſomewhat thickened, in the whole of that ſpace wherein the bone had been laid bare.* The cerebrum which lay beneath theſe thickened parts of the meninges, had contracted a very evident, though a very ſlight injury; for externally the ſubſtance thereof was corrupted to the ſize of a ſmall vetch; and *in the middle it ſeemed to be perforated with a very ſmall foramen.* But this foramen, together with the corruption, did not deſcend lower than to a very ſmall depth."

" A virgin, of five and twenty years of age, having fallen upon the ground, was wounded with a very ſharp ſtone in the left part of her forehead. Being received into the hoſpital, ſhe was troubled with a continual fever, which increaſed every day. The wound began to be ſeized with a gangrene, which, in that ſeaſon, (for it was the month of June 1689), came upon all wounds. Some time after, the patient became idiotic, as it were; ſhe heard but little; ſhe ſpoke not at all; ſhe fixed her eyes ſtedfaſtly on thoſe about her. *At length a tremor of the whole body came on, during which ſhe died; and this was about the beginning of the 28th day.*

" The bone that lay beneath the wound was hollowed out with a ſmall dent, and a foramen, as it were, externally; about which were ſeen three chinks. But neither theſe chinks, nor the foramen, reached to the internal parts. *Yet the meninges, in that part which anſwered to the wound, were both of them eroded;* and from hence a ſerous colluvies was diſcharged, which, being diffuſed through the whole ſubſtance of the brain, had infected it with a diſagreeable odour, and tinged it of a blackiſh colour.

" A young man, of eighteen years of age, ſlender, and of a blackiſh colour, having received a blow by a ſtone that was thrown againſt one of the oſſa ſincipitis, where the temporal muſcle ariſes from it, paſſed two days without any ſymptom

worthy of remark, if you except a fever. But on the ſixth day after that, as he lay in the hoſpital of St Mary de Vita, the wound became livid, and the diſcharge which came from it was exceedingly fætid; beſides which, he had an acute fever. To theſe ſymptoms were added, near the eighth day, a ſoporific diſorder; ſo that, when ſpoken to, he made no anſwer. Sometimes he ſent forth *a kind of ſuſpirious voice*. His whole face became tumid and yellow. With all theſe ſymptoms he went on to the eleventh day; on which, *with a very great expiration, he died.*

" The whole body ſeemed to be that of an icteric perſon. From the wound a purulent matter had made itſelf many paſſages betwixt the cranium and the cutis, which it had alſo eroded. And the bone had contracted ſome roughneſs on the ſurface, from the ſtroke of the ſtone; but ſhewed no injury on the internal ſurface, which fell under the notice of the ſenſes. However, betwixt the bone and the dura mater, *in the interſtices of the veſſels of this membrane, was obſerved a cineritious matter, not much unlike a condenſed pus, in that part only which lay under the blow;* and in the ſame part only, *the cerebrum had contracted a livid colour, to the depth of two inches* *."

But I will ſpare you the quotation of narratives, deſtitute of variety, and diſguiſed in language which, only in ſome reſpects, reſembles Engliſh. This caſe is followed by that of a young man, who became delirious on the 15th day of a contuſion, and died more quietly than by a "*great expiration, with a ſuſpirious voice,*" for he " ceaſed to live any more." This is perfectly intelligible and plain; the numbers who thus ceaſed to live, is ſuch as to " ſwell this epiſtle (as Morgagni himſelf acknowledges) to the bulk of a volume." To writers celebrated as Valſalva and Morgagni we reſort, with a natural confidence of finding ſenſe and reaſon combined with intereſting facts; but of all melancholy ſcenes, that of their ignorant practice is the moſt afflicting; and of all ſcholaſtic jargons, that of Morgagni, in his " EPISTLE UPON CHIRURGICAL AND UNIVERSAL DISORDERS," is the moſt contemptible. It is a ſorry ſight to ſee young and old, ſickening on the 7th, delirious on the 18th, and dying on the 20th day, unregarded; and though in each caſe there were deciſive ſigns of an abſceſs on the brain, never a thought ſeems to have been entertained of giving vent to the matter. In all theſe caſes, the proceſs of the ſuppuration ſeems regular, the ſtages marked, the ſymptoms

* *Alexander's Morgagni.*—Morgagni's volumes are ſo precious, that any kind of tranſlation was in a degree acceptable. A man has ſet himſelf the taſk of tranſlating the moſt perplexed book in our ſcience, who has not as many words as a parrot; but by repeating the expreſſions fallacious, precarious, &c. he makes it out amazingly.

invariable, the cauſe moſt unequivocal; and yet theſe great men eſcape this plain direct duty, by ſo poor an evaſion as that of ſaying, "But how ſhall we find an interval in which the ſucceſs is ſtill probable, and yet the ſymptoms urgent for applying the trepan *?" By the uniform courſe of that proceſs, which Valſalva has but too often and too truly deſcribed, the time for interpoſing is diſtinctly marked,—it is ſo far marked, that Morgagni himſelf ſeems conſcious in all theſe caſes, that the patients were ſure to die. Are we to offer no chance for life, where there is nothing but deſpair? Can the ſurgeon be ſaid to deſtroy by his operation a patient who is declared paſt all hope? Can a patient ſuffer greater agony than convulſions, or be worſe than dead?

It muſt be advantageous to contraſt, with the rules and practices of modern ſurgeons, the conduct of ſuch phyſicians, the dogmas of another age, of another profeſſion, of men ſkilled in legends and doctrines, but little acquainted with practice. But Morgagni and Valſalva are not alone to blame; theſe were the prejudices of the age in which they lived. Phyſicians, unwilling that the operation of trepan ſhould be at all reſorted to, imagined various ways by which a man might ſpontaneouſly recover from ſuppuration of the brain, by tranſpiration of the matter through the inviſible pores of the bone itſelf,—by its abſorption and diſcharge through ſome common emunctory,—by its tranſlation to ſome diſtant part.

If matter was formed upon the brain, they imagined no poſſible way by which it could be depoſited there, except by dropping through ſome crack in the bone; if none was found, or a very little, they conjectured that it muſt have been abſorbed, and conveyed away; and very greatly were they aſtoniſhed, "when, (as in a caſe by Morgagni, p. 128.), having diligently inquired after the paſſages by which pus could enter the cranium by the wound, they found all the bones that compoſed the cavity quite free from injury on their internal ſurfaces."

If, in one who died of injury of the head, it happened by any chance, that there was at the ſame time an abſceſs, however ſmall, in the liver, or lungs, it was re-

* "Thus you very plainly perceive, that caſes may happen, wherein either no ſymptoms of blood, being extravaſated in the cranium, offer themſelves in the beginning, or they are very ſlight; but after a long interval, ſo many and ſo violent ſymptoms crowd upon and attack the patient, that neither in the firſt part of the diſeaſe, which is convenient for trepanning, the patient can be ſtruck with ſuch a fear, as to make him admit of that operation, nor in the latter part can the phyſician hope to be of any uſe to the patient thereby; as you cannot ſuppoſe, after ſo long a ſpace of time, and after the exiſtence of ſo many deſtructive ſymptoms, that a corruption of the parts was not brought on, though it was abſent, almoſt beyond belief, in that very rare obſervation of Scultetus."

garded as a conſequence of the tranſlation of the matter from the injured part, for what wiſe purpoſe of nature, no one could tell. Nay, ſo crude and unphiloſophical were the notions of theſe dogmatiſts, that they actually believed that there was ſome ſort of paſſage, by which the matter moved along from part to part, and could be traced in its travel from the head, through the neck, to the abdomen; "for often I have obſerved, (ſays Marchetti), that when in wounds of the head, the neck, eſpecially towards its ſides and poſterior parts, begins to ſwell, the matter is falling down towards the thorax, which in no great ſpace of time ſo erodes both lungs and pleura, as to make its way to the abdomen, affecting in like manner the liver and ſpleen *."

Matter, if not found under the cranium, whether found in the liver or not, they believed muſt have ſomehow been conveyed away; and that, had the ſurgeon been but a little more ſudden in his motions, he might have found, at an early ſtage, under the ſcull †, that matter which was then perhaps travelling through all the veins of the

* "Obſervavi ſæpiſſime, quod quando in his vulneribus collum incipit dolere, parte potiſſimum poſtica, et laterali, tunc materia purulenta delabitur ad thoracis, et abdominis cavitatem, quæ longiori mora cum pulmones, tum pleuram, aliquas nempe ipſorum partes erodit, ex quibus multa ſanies emanat, quæ poſtmodum ad abdomen defluit, cum jecoris et lienis labe, in quibus varias puſtulas excitat, quibus diſruptis, perinde ac ex pulmonibus, et pleura, ita et ex his materia purulenta effluit; quanquam hujus obſervationis ignari, exiſtiment, abſceſſus obortos in his partibus, quorum ratione patientes moriuntur, non ex capitis vulnere, quod ex capite copioſum pus poſſe ad inferna viſcera delabi non ſibi perſuadeant: prout in pleriſque obſervavi, mediam thoracis, et abdominis cavitatem pure fuiſſe refertam."

† "If you compare this hiſtory with thoſe animadverſions which I made above, you will readily ſuſpect the cauſe from whence a pleuriſy had ariſen in this young man; and *that the very ſmall quantity of matter which was found under the dura mater, was the remains of ſome which had exiſted there in much larger quantity*, the other part of it having been tranſlated into the thorax in particular, and into the whole body in general; as the univerſal ſtate of putrefaction ſhowed. *And, if this was the juſt idea of the caſe*, it were to be wiſhed, that before the matter could have been carried to theſe parts, *it might have been extracted by a perforation of the cranium*."—Many have ſagaciouſly pointed out the ſymptoms and ſigns by which it may be known when and how the matter is dropping down to the liver. "Joh. Virſangius ait ſe ex apertione multorum cadaverum didiciſſe ejuſmodi abſceſſus poſt funeſta, imprimis muſculi temporalis vulnera! proveniſſe." And Marchetti ſays, "Quando in his vulneribus *collum incipit dolere, parte potiſſimum poſtica, et laterali* materiam purulentam *delabi* ad thoracis et abdominis cavitatem, ſæpius ſe obſervaſſe."

And Slegelius found out a moſt ſubtile cauſe for that peculiar appearance of a wound, which indicates danger, or approaching death. "Animadvertit omnes quibus capitis vulnus lethale fuiſſet, ante obitum conqueſtos fuiſſe, de hepatis vel lienis dolore, dicitque ſe in ipſorum cadaveribus abſceſſum ſemper reperieſſe hepatis, quem ex metaſtaſi puris ortum fuiſſe putat, *qui vulnus eo tempore fuerat valde aridum et ſiccum*."—In ſhort, *that the wound of the ſcalp is pale, ſhrunk, and arid, becauſe the matter has been transferred from it to the liver.*

body, ſeeking its way through all the paſſages, and ſticking in all the pores. Theſe are ſevere accuſations againſt the greateſt men of that age, but unhappily they are but too well ſupported *. "A robuſt country lad, (ſays Morgagni), having fallen from a high place, had hurt his head. He lived as uſual for three days, and followed his profeſſion; but a tumor ſoon appeared, a fever enſued; he was thus driven to take ſhelter in the hoſpital. When every remedy was applied by the phyſicians, he ſeemed to recover; but, about the 17th day, being able to bear hunger no longer, he was ſo preſumptuous as to eat; the fever, headach, and vomiting, returned. He was trepanned, but the dura mater was ſound. He was ſuddenly ſeized with a pleuriſy, and died. The carcaſe was livid below the throat, and throughout extremely putrid." "If you compare (ſays Morgagni) this hiſtory with the animadverſions I have formerly made, you will readily ſuſpect the cauſe from which a pleuriſy had ariſen in this young man, and *that the very ſmall quantity of matter found under the dura mater, was the remains of ſome which had exiſted there in much larger quantity, the other part of it having been tranſlated into the thorax in particular, and into the whole body in general* †." And why into the whole body in general? and why into the blood and lymphatic glands? That the fever might be accounted for; and that when ſuch matter was neither found within the cranium, nor in the lungs, nor in the liver, nor in the reins, it might be ſuppoſed courſing round the body. But how comes it to paſs, that abſceſs of the liver and lungs, do really accompany wounds of the head? This word *accompany*, is itſelf an explanation, for I cannot think it at all more extraordinary, that abſceſs of the liver ſhould accompany abſceſs of the dura mater, than that wounds of the head ſhould be accompanied with bruiſes of the body. If you open many bodies, dying of fractures of the ſcull, you will find, if life has been long protracted, ſuppuration of the liver, or lungs: if the death be ſudden, you will find only effuſions of blood in the thorax, or abdomen ‡. This robuſt young

* That the pus carried from the other parts into the viſcera, is not always depoſited in the proper form of pus, but frequently, at leaſt that many of its particles being mixed with the blood, and intirely disjoined from each other, ſtick in ſome narrow paſſages, perhaps, of the lymphatic glands, and by obſtructing and irritating them, as happens in the production of buboes, and by relaxing the humor, diſtends them, and produces tubercles, &c. Such are the ingenious theories of Molnelli, as quoted by Morgagni with a great reverence and approbation, p. 103.

† Page 138.

‡ In the caſe of Sharp, the dancing-maſter, related p. 358. there had been, from the violence of the fall, a

man fell from a great height; and when a man falls from ſuch a height, as to have the ſcull hurt, the ribs fractured, and even the vertebræ broken, it is not to be wondered at if the lungs and pleura ſuffer, or if the weight and looſeneſs of the liver cauſe ſtill more frequently an effuſion of blood in that viſcus. Perhaps, when a man having fallen into a quarrel, has got blows about the head, has at the ſame time an inflammation in the liver or lungs, the phyſician would ſhow his wiſdom more rich in inquiring, whether he got, along with his broken head, what Sancho emphatically calls a "rib-roaſting," than by what ſecret paſſages matter had deſcended through the neck into the lungs *.

Occupied with ſuch idle ſpeculations, Morgagni, Valſalva, Marchetti, and all the Italian phyſicians, looked with perfect compoſure upon their dying patients, expected the tranſlation of matter, counted out the critical days, gravely foretold death, and yet refuſed the aſſiſtance of the trepan. It was not poſſible that they ſhould long believe in this metaſtaſis, or tranſlation of matter, without thinking of means for promoting ſuch abſorption, by pigments and potions. What theſe pigments and potions are, you may learn from Fallopius, Muſitani, or any author of that age, but eſpecially from the *liber aureus* of Berengarius, the beſt and ſobereſt of thoſe who believed in the doctrine of tranſlation. The compounds which diſcuſs effuſed blood, or tranſlate pus, are innumerable; and thoſe which were ſuppoſed to have the happieſt effects, do not ſeem to have had the moſt diſtinguiſhed origins. "One Berengarius learnt indirectly from certain Spaniſh ſailors, and found it equally uſeful in all conſtitutions, periods, and circumſtances †; it is a tincture of myrrh, aloes, and ſaffron in ſtrong ſpirits. Another he learnt from a Jew quack doctor. "Quidam Hebræus, ſatis mihi amicus, et inter empyricos fide dignus;" a tincture in which wine, madder, muſtard, dittany, betonica, parcely,

great effuſion of blood into the lungs. In the caſes related by Morgagni, p. 103-4. blood was effuſed in almoſt all parts of the body; the liver black with extravaſated blood, and the fractured ribs viſibly protruding through pleura.

* Morgagni, let. 5. art. 4. aſcribes a ſuppurated ſtate of the brain, to the cancerous habit of the woman, who had her leg amputated; *and to the transferring of the pus from the ſtump to the ſurfaces of the ventricles of the brain.*

† "Repertus eſt etiam, quidam alius modus, primo a certis Hiſpanis nautis, (ut retulit mihi fide dignus quidam); deinde a certis Januenſibus in Italia, quem poſt multi ſunt ſeculi, et eſt cum aquis et pulveribus infra deſcribendis. *Illis indifferenter in omni ætate, læſione, complexione, et tempore, et ut breviter,*" &c.

cloves, mallows, gentian, maidenhair, agrimony, century, and indeed a whole materia medica of herbs and roots." But it is a medicine too good, I find, to be efficaciouſly adminiſtered by practitioners of modern times: For, "when thou giveſt each cup, thou muſt make the ſign of the croſs, ſaying, In the name of God the Father, God the Son, and God the Holy Ghoſt, and of the whole Trinity, I give thee this;"—the patient ſaying, "Thou, O Lord, giveſt the virtue; thy right hand ſhall deliver me; I ſhall not die, but live to praiſe thy works *." "If the ſick perſon (ſays Berengarius) retain his draught, and do not vomit, he ſhall receive no benefit therefrom; if he vomit, his head ſhall be relieved." The relief which vomiting might bring, I believe, he could not be long without; for the balſam of Firebras, adminiſtered by Don Quixote to his truſty ſquire, ſeems to me honey and balm to the inward parts, compared with the inteſtine commotions that this tincture muſt have produced. The motive which Berengarius acknowledges, (and I confeſs it is in ſome degree my own), for giving theſe precious pigments a place, is, "Ut hoc noſtrum opus magis ſit pingue et delectabile;" though the epithets, *pingue et delectabile*, were more appropriate to the complexion of a merry ſong, than a ſurgical book.

You will not eaſily believe what ſerious and important reaſons I have to aſſign for taking notice of theſe things. Though puerilities ſuch as theſe are in no danger of being repeated; yet, in paſt times, they have had the moſt unhappy effects in practice; a confidence in theſe wretched faragoes ſupplied, in the opinion of the great Morgagni, of Muſitani, of Magatus, of Vidius, of all the doctors of this party, the place of the operation of trepan. "All the patients I have referred to, (ſays Morgagni), were perfectly cured *without the aſſiſtance of the trepan*, and that very ſoon. A lady, whoſe horſes had taken fright, threw herſelf from the chariot, fell among ſtones and hard ice, and lay for dead. The other phyſicians being alarmed, I was called, and urged many reaſons why we ſhould apply the fomentation which Ruyſch had frequently made uſe of, and with great ſucceſs, and not contrary to the cautious admonitions of Magatus, but having in it ſome of the ingredients that he had recommended. The phyſicians came into my opinion; nor had they reaſon to repent it, as by continued uſe of this remedy the patient firſt became a little better, and

* Pro quolibet cyatho, et crucis ſigno facto, in nomine P. et F. et Sp. et individuæ Trinitatis, dicatur: dextera Domini exaltavit me; non moriar ſed vivam, et narrabo opera Domini."—*Berengarius*, p. 130.

then came quite to herſelf, and died long after of old age." "But before I ceaſe to ſpeak of this fomentation, I would have you to obſerve, that *almost all thoſe perſons* that I ſaid had been ſaved without the trepan, *which otherwiſe ſeemed neceſſary*, and others of the ſame kind, have *been ſaved by means of this fomentation*, or at leaſt by ſomething very ſimilar to it *."

"Saved by Figs-ends!" To be ſaved, implies the active interference of the phyſician, or ſurgeon; to be ſaved from abſceſs of the brain, from ſickneſs, from palſy, and delirium, already begun, (the caſes which he here inſinuates were ſo cured), requires ſomething very different from fomentations, from infuſions of marygolds, or decoctions of Fennel and Rue. If a few recovered, it was through the natural powers; and none, I am perſuaded, recovered without trepanning, who had effuſions either of blood or of matter upon the brain.

The purpoſe theſe authors had in their writings, was of a very different kind from what might be at firſt ſuſpected in looking into their works. The humane enterpriſe they had entered upon, was, to diſſuade and terrify ſurgeons and patients from that kind of relief which the ſkilful in all ages have appointed for ſuppuration of the brain, and utterly to abrogate the uſe of the trepan. "Exploſimus fracti cranii tum trepanationem, tum meningum et cerebri vulgarium curationem, (ſays Muſitani); nunc noſtram in vulneratorum ſolamen cito tuto, &c. in his curandis duplicis generis medicamenta ſunt neceſſaria, alia externa, alia interna;" and after this imperious language, this bold commendation of his medicamina duplicis generis, his pair of medicines, external and internal, he breaks out into a raving fit againſt trepanning, and againſt ſurgeons, ſo extravagant, that it might have entitled him to a liberal doſe of the moſt powerful of his own pigmenta: "A helliſh invention, (he calls the trepan), imagined by none but Satan himſelf, by Beelzebub, by the prince of devils, and put by his art into the accurſed hands of ſurgeons! a weapon (ſays Muſitani) with which they have filled innumerable graves, and crowded the banks of the infernal river with ghoſts †."

* P. 145.

† Againſt the much-admired precept of Celſus, "Anceps preſtat quam plane nullum experire remedium," excellent as it has been eſteemed, Muſitani proteſts in ſtrong terms, "quaſi humano generi perduellis, et funeſta." He ſays the moſt daring things of the much-admired Celſus: "Fuit Celſus rudium vulgarium patronus, et humanæ cladis auctor;" and of the perforation of the ſcull he ſpeaks in terms of deteſtation: "Hæc maledicta cranii perforatio vulneratorum myriades tentatæ immolavit, non exiguos implevit ſarcophagos et innumeros defunctos animos ad Charontis cymbam adegit, quum a Beelzebub dæmonorum principe, et humani generis hoſte, nactam fuiſſe, et nefariis conſignatam chirurgis credimus." This exploſion of ex-

So prevailing was the influence of thofe phyficians, that in all the cities of Italy, no one would, even in the moft defperate circumftances, fuffer his friend to be trepanned: The operation fupplanted by thefe precious medicines fell quite into difufe *; hence the innumerable deaths, recorded not only by Valfalva and Morgagni, but by Bonetus, and by Horftius alfo, and indeed by every collector of facts. You no fooner open the volume of Horftius, than you plunge into the fame miferable detail that you read in every page of Morgagni; numbers dying unaffifted of contufio cranii. His very firft cafe is that of a young man, who being, in a quarrel betwixt the townfmen and ftudents, wounded on the head, was permitted to linger a whole month unaffifted, though plainly dying; and when he died, the fcull was fo completely carious, that a large piece of it dropt away.

Thefe phyficians denied the ufefulnefs of the trepan, and doubted the exiftence of fuppuration; for Hornungus, in a letter to Horftius, after many compliments on the manner in which a certain cafe is drawn out, fays, "Dubitet jam de cerebri apofthematibus qui volet; ego ruftici ifthius Gottingenfis (phalange vulnerati) exemplo confirmatus, amplius dubitare nolo." Yet they did not truft fo entirely to the cure by vulnerary tinctures, as to their calumnies againft the operation. They tafked their ingenuity, in inventing objections againft the operation of trepan; there was no kind of reafoning they did not condefcend to ufe. Morgagni dedicates many a wearifome and infipid page to this drudgery, falls a-conjecturing about an art he plainly did not know, and expatiates upon the "many, and various, and difficult caufes, for which the perforation of the cranium, though fkilfully and innocently performed, may neverthe-

travagance is in the peculiar ftyle of Mufitani, who continually raves about cheats and impoftors, furgeons, old women, and quacks, and hangmen, and farcophagi, and Charon, and Beelzebub, and all the infernal divinities, Chriftian and Ethnic.

* There is no occafion, therefore, to wonder that the people of this country began to refufe the affiftance of this remedy, being deterred from it by experiments of its being ufelefs in particular, or injurious; and this not only in *one or two cities, but in moft of the cities of Italy*; and, befides our countrymen, by others alfo, amongft whom Wepfer hints that his countrymen were, at a time when the ufe of the trepan even flourifhed among us: his words are, "The Italians, and other inhabitants of the more warm regions, would have determined to make ufe of the trepan immediately; and the very experienced D. D. Burgouverus would have done the fame thing, if the patient, and thofe who were about him, had not entertained a dreadful idea of a remedy which they were unufed to in thefe places, and which is terrible to moft perfons, even by its name alone, and had not, in confequence thereof, refifted his endeavours."—*Morgagni, as traduced by Alexander*, p. 140.

leſs become uſeleſs." He "*ſuppoſed*, that the blood might be extravaſated, not under the cranium, but in the ventricles, or upon the baſis of the brain *;" or that it might be extravaſated under the cranium, but at a point where the ſurgeon would not dare to perforate, under the temporal muſcle perhaps, or beneath the frontal ſinus †." Morgagni had all the learning and all the prejudices of the phyſician; he is very liberal of quotations and authorities, againſt cutting the muſcle, or trepanning the ſinus, and talks as if the queſtion of perforating or not perforating the ſcull, were one of mere expediency, and not of life or death: as if the occaſional thickneſs and thinneſſes of the cranium ‡ were motives for refuſing help.

He *ſuppoſed*, too, that the blood, though actually extravaſated betwixt the dura mater and the cranium, though in places eaſily acceſſible, might be ſo congealed, as to defy the inſtruments of the ſurgeon: was not this an admirable ſuppoſition? "where nothing forbids perforation, (ſays Morgagni), yet if, being coagulated, it adhered ſo cloſely and tenaciouſly to that membrane, as not to *be ſeparated therefrom without violence*, as it has happened to many others, and to Valſalva himſelf, more than once to find it: it is of courſe needleſs to apply the trepan" That ſuch puerile conjectures ſhould be made by men celebrated like Morgagni and Valſalva,—that they ſhould imagine a ſurgeon to be rationally employed when contriving menſtrua for diſſolving blood thus congealed, and

* "Take care how you ſuppoſe, that I here wiſh for greater diligence, or ſkill, in theſe very celebrated men. There are cauſes enough for us to accuſe, as I had begun to ſay. Thus ſuppoſe, for inſtance, that blood is ſometimes extravaſated within the ventricles of the brain, or under the baſis of it."

† "At other times it may be extravaſated externally indeed, and at the upper part, but under the dura mater; or if above this, yet in a place directly oppoſite to which the ſurgeon dare not trepan; for inſtance, under the muſcles of the temples, or oppoſite to the pituitary ſinuſſes of the forehead."

‡ "Suppoſe, a ſurgeon, who happened to be ignorant how often dents or cavities are impreſſed upon the internal ſurface of the cranium, which cavities I have already ſpoken of to you, and which ſometimes receive ſo very deeply the tubercles, as they formerly called them, of the dura mater, that you will have only one, and that a very thin external lamina of the bone, remaining, eſpecially in the oſſa ſincipitis, and ſometimes in the os frontis; through the ignorance of which circumſtances, I fear, leſt ſome obſervers have conſidered them as diſorders of the cranium, and dura mater; if he then, I ſay, had by chance borne down the trepan againſt any one of theſe cavities, for they have no certain ſituations, he would, without doubt, firſt have injured the dura mater, and the parts whereby it is raiſed up, before he could have ſuppoſed the whole of the firſt lamina to have been pierced through by him: or, if another, having laid bare the ſame membrane by the trepan, and ſuppoſing pus to be confined under it, (for there ſometimes is pus), as we learn from many obſervations," &c.

pouring ſuch diſſolving menſtrua into the trepan-hole, or dropping into it (as Marchetti directs) pigeon's blood, proves only how little they were entitled to prejudge ſuch a queſtion, and how much, in matters of ſurgery, actual practice is indiſpenſable to a right knowledge of facts *.

It was alſo *ſuppoſed*, that blood might be extravaſated in diſtinct places, ſo divided from each other by adheſions of the dura mater, as to prevent all communication, that neither the blood could be fully evacuated, nor the reſolving fluids be rightly injected. " And you may, moreover, (ſays Morgagni), *ſuppoſe*, if you will, all that I have ſaid concerning blood, to be ſaid alſo of pus;" viz. that it may be *too thick*; that it may adhere, by *its own tenacity*, to the dura mater, or be detained by the adheſion of the dura mater to the ſcull.

" *Suppoſe*, ſays Morgagni †, (for it is a ſuppoſition from firſt to laſt), ſuppoſe the veſſels ruptured, of what effect would it be to perforate the cranium, in order to draw out extravaſated blood, if *ſtill freſh and freſh extravaſations were made*,

* " To take notice of ſome of theſe only; at leaſt, though the blood was extravaſated betwixt the dura mater and the cranium, and in thoſe places even which nothing forbids us to perforate; yet if, being coagulated, it had adhered ſo cloſely and tenaciouſly to that membrane, as not to be ſeparated therefrom without violence, as it has happened to many others, and to Valſalva himſelf, more than once, to find it; for we particularly refer to nothing, as you may even have obſerved above, but you have examples of almoſt every circumſtance in the preceding or in the preſent letter; of what advantage would it have been to perforate the cranium?

" You will perhaps ſay, But if it had adhered in this manner, even before death, a ſkilful ſurgeon would have been able to apply ſuch things as might diſſolve, and ſet it looſe. Let us ſuppoſe it. Yet, what if ſome part of the coagulated blood lay in ſuch a place as the infuſed fluid could have no acceſs to; for you are not ignorant that this membrance adheres very cloſely to the cranium; and that it follows from hence, that one place, wherein it is ſeparated from the cranium, cannot communicate with another, though very near, in which it is likewiſe ſeparated, or at leaſt ſo expeditiouſly, as would be neceſſary for it both to enter and to be diſcharged.

" Nor am I ignorant by what inſtruments ſurgeons can ſeparate ſome neighbouring part of the dura mater from the ſcull; and that the patient, by holding his breath at intervals, may urge the cohering matter, and procure it a more eaſy diſcharge from its receſſes."

† " Suppoſe that the arteries either were not in the number of the largeſt, or were not altogether ruptured; for in this caſe there would not be time to apply the trepan. Yet of what effect would it be to perforate the cranium, in order to draw out the extravaſated blood, if ſtill freſh and freſh extravaſations were made, and added to the firſt, by the arteries, though of the ſmaller ſize, which were not altogether ruptured? I omit other cauſes, even thoſe which are not to be imputed ſo much to the careleſſneſs and errors of the ſurgeons, as of the patients and thoſe who are about them, which are not always known to the common people; and I go on to that from which I ſuppoſe it has more frequently happened, than from others, that the perforation of the cranium might, to the populace, ſeem of no effect."

and added to the firſt, by the arteries of a ſmaller ſize, which were not altogether ruptured?" though the truth is, that ſucceſſive extravaſations were never known to have happened. "*Suppoſe* (ſays Morgagni) there are ſigns from which we *ſuſpect* that blood is extravaſated within the ſcull; who can for a certainty ſay, whether there is really ſuch extravaſation?" No man; no man can at once ſuſpect and know; no man can be at once doubtful and certain; but if, indeed, a ſurgeon may not operate when directed by ſigns and ſymptoms, by rational and probable concluſions; if he is to apply the trepan only when he can ſee or feel the extravaſated blood or pus, there is an end to all operations, all conſultations, all reaſoning upon that ſubject, which I have always eſteemed the moſt important in ſurgery. We ſee by what unfortunate prejudices Morgagni's own mind was influenced, by what ſhallow reaſonings he ſought to infuſe the ſame doubts into the minds of others. He has ſaid, that the ſymptoms are always either too ſlight, or too violent; that it is always too early, or too late, to reſolve upon ſo alarming an operation. There never is a time perfectly ſuitable for doing that which one diſlikes; Valſalva and Morgagni deliberately reſolved never to allow their patients the chance or benefit of ſurgical advice, or ſurgical aid. They diſcouraged all inquiries into the condition of the ſuppurating brain,—condemned the operation which might have given relief,—contented themſelves by ſhowing their ſkill in prognoſticating death; all their patients were carried unaſſiſted to their quiet graves; and each diſſection proves, THAT LESS DELIBERATION AND MORE ENERGY MIGHT HAVE SAVED THOSE WHOM NO RASHNESS COULD HARM.

You will not, Gentlemen, be ſurpriſed, when I contraſt with the ſpeculations, theories, and conjectures of phyſicians, on queſtions purely ſurgical, the opinions and practice of our celebrated ſurgeon Pott, whoſe opinions and writings are ſo juſtly eſteemed, who ſaved, by his dextrous operations, hundreds of thoſe who muſt have periſhed under the guidance of Valſalva or Morgagni. He was engaged in that tumult of practice, which left him little time to frame general laws; yet he could not fail to act with good ſenſe and ſkill in each individual caſe: He was ſure to practiſe right, but in danger of teaching wrong, or at leaſt imperfectly: His opinions want but one ſhort explanation, for they are ſuch as will never be diſputed, where they are underſtood.

"For my own part, (ſays Pott *), I have no doubt, that, although by eſtabliſhing it as a general rule to perforate in all caſes, ſome few would now and then be

* Page 148.

ſubjected to the operation, who might have done very well without it; yet, by the ſame practice, many a valuable life would be preſerved, which muſt be inevitably loſt without it, there being no degree of compariſon between the good to be derived from it, when uſed *early as a preventative*; and what may be expected, if it be deferred till an inflammation of the dura mater, and a ſymptomatic fever, make it neceſſary?"

A preventative! How could the operation of trepan prevent inflammation of the dura mater? could perforating the ſcull with a ſaw, tearing up the veſſels which naturally connect it with the dura mater, and expoſing that membrane to rude dreſſings, and the touch of inſtruments, prevent inflammation? Yes, ſurely: it could prevent all the dangerous conſequences of inflammation: it could prevent matter accumulating, and inflammation ſpreading: it could prevent ulceration penetrating to the brain: it could convert an extending and moſt dangerous abſceſs into an open ſore: it could enable the dura mater to granulate and unite with the integuments. There is no good purpoſe that a timely operation might not ſerve; and if the trepan be uſed only when it ſhould, there can be no veſſels torn; nor will the the dura mater be expoſed, for the dura mater is previouſly in a ſtate of ſuppuration, and ſeparated from the inner ſurface of the ſcull. We find, by his examples, that Pott meant by prevention, the anticipation of worſe ſymptoms, the preventing of death; that he regarded the operation as preventative, when it was uſed ſo early, that though the dura mater had previouſly ſuppurated, the ſuppuration was but ſlight; when by the timely opening of ſuch abſceſs, it was prevented reaching the brain, when the dura mater granulated eaſily, and healed naturally. Unleſs we were to take an ungenerous advantage of a ſlight inaccuracy of language, and diſpute the words of this author, while we underſtand his ſenſe, we muſt acquieſce in the principles he has laid down, and give him honour and praiſe, for the comprehenſive and judicious views he has taken of what he ſaw going on around him, for the honeſt and manly boldneſs with which he has declared his principles, ſo different from thoſe tranſmitted to us by the writers of the preceding age, and for the generous manner in which he has taken upon himſelf a reſponſibility of the moſt critical nature, reſiſting alone all that torrent of reproach which was likely for a time, and eſpecially in his own day, to be attached to what may be termed Hoſpital Practice, harſh and cruel ſurgery. But ſtudy his caſes, and you will perceive, that whenever Pott trepanned, the patient was in danger, the bone bare, the tu-

mor puffy, or the wound (if there was one) fætid, the pulſe quickened, the face fluſhed, the head in confuſion, and the fatal ſhiverings begun; and theſe are marks, not of future danger, but of actual ſuppuration. It is fortunate for mankind, when new doctrines are not extravagant; when thoſe who enjoy the public favour, have won it, not by the capricious and captivating effuſions of genius, but by the laſting attraction of ſober inquiry and ſterling ſenſe; when a popular work contains principles which, being founded on experience, will ſtand the teſt of time.

DISCOURSE III.

SKETCH OF THE ANATOMY AND PATHOLOGY OF THE BRAIN.

THE title of our preſent ſubject reminds us of its extent and value: the ANATOMY AND PATHOLOGY OF THE BRAIN, implies deſcriptions more or leſs extenſive of the parts, the ſtructure, the morbid affections of an organ, which rules over all the motions, and all the ſenſations of the body. Whatever be the nature of the brain, its influence over the ſyſtem is paramount; the brain receiving a ſhock, the whole body becomes torpid; the brain being oppreſſed by congeſtion of blood, within its veſſels, the ſenſes are obſcured; the brain ſuffering compreſſion by the extravaſation of blood on one ſide, one half of the body is ſtruck with palſy; and any of thoſe compreſſions being great or long continued, there enſue vomiting, inſenſibility, coldneſs of the extremities, and total palſy, ſo that the ſphincters are relaxed, and the fæces and urine paſs involuntarily; a ſtate invariably followed by death. When the brain is ulcerated on its ſurface only, but not oppreſſed, we are warned of the danger by unuſual terrors, a nervous ſtate of the ſyſtem, diſturbed ſleep, trembling of the hands, and tottering of the knees, ſhiverings and fever, which denote the approach of death: When it is inflamed throughout its ſubſtance, its function is excited to phrenzy, delirium, or mad-

nefs: Even when it is but flightly oppreffed and difordered, fromi rregular circulation, all the body partakes of the diforder. When the affection of the brain re-acts flowly on the body, when this part, whofe influence moves every organ, and regulates every feeling of the fyftem, lofes its influence, the ftomach is affected, ficknefs and languor enfue, with debility of the limbs, wafting of the body, and diforder of mind; and at laft, feelings of defpair and diftraction take poffeffion of the patient, whofe haggard countenance, and jealous eye, gloomy thoughts, and difordered perceptions, mark the difeafe we call Hypochondriafis.

The brain, intereffing as it may be to the philofopher, is infinitely more fo to the phyfician, not as the feat of intellect, but as governing all the vital, and all the voluntary motions, regulating every action, and every fenfation, fo that we have no health nor pleafure, but in proportion as its functions are found. Both the delicacy of the brain, and its univerfal influence over mind and body, gives a complicated form to all difeafes arifing either from any diforder of its circulation, or injury of its ftructure. Such is its extreme delicacy, that if we but ftoop, or run, or laugh, confufion of head, giddinefs, and faintnefs, intimate how eafily it is affected by the flighteft acceleration of circulation; when we bleed from a wounded blood-veffel, though fuch bleeding is attended with no real danger, and produces no permanent effects, we faint and fall down, feel cold and motionlefs, from the blood ceafing for a moment to circulate with due energy within the brain; when, from a continued affection of the brain, the ftomach is affected, an indefcribable train of nervous maladies enfue. It is not, then, a furgical or local diforder manifeft to the fenfes, that I am now to defcribe, not the fracture or caries of a bone, important only as it belongs to a part deftined to defend the brain, but the conftitution and difeafes of the brain itfelf; the internal and natural diforders of the moft delicate organ of the body, whofe function is not merely neceffary to intellect, but to life; whofe diforders affect every function, vital and voluntary, the power of the mufcles, the functions of the ftomach, the particular fenfations of the parts, and the feelings of the mind. The views I am to lay before you of the ftructure and difeafes of the brain, muft influence your reafoning and conduct in matters of daily practice; my inftructions, not limited now to the trepanning of the fcull, or the cutting away a carious bone, relate more or lefs remotely to almoft all the difeafes of the living fyftem; and believe me when I fay,

that in writing upon ſuch a ſubject, I touch it with reverence, I proceed with caution and reſerve, to deduce ſimple views of practice from facts and diſſection; and, ſhould I feel that I have been in any point incorrect or precipitate, I ſhall think it a proud and virtuous employment, to recede from my errors, whatever be their nature, and retract them openly and ingenuouſly.

If I may any way expect the felicity of eſcaping errors, or of perceiving and retracting them, it muſt be by abandoning theories, ſuch, at leaſt, as have hitherto obtained that name, and appealing to anatomy, to the innumerable and moſt intereſting proofs of each diſeaſe, being accompanied with a correſponding change within the brain. What but the neglect of anatomy could make the ſubject the moſt intereſting in the whole circle of medical ſcience be neglected? Yet I muſt not ſay neglected: no, much ingenuity has been waſted in developing the powers and properties of the nervous ſyſtem; there is not a ſymptom of deranged action, or irregular ſenſation, which is not exquiſitely explained; doctrines of nervous tremors, and nervous fluids, and experiments on the irritable and ſenſible fibre, have occupied the profeſſion for centuries! Without inquiring into the ſtate of the brain, (the ultimate ſeat of this ſenſibility), ſuch affections are pronounced nervous: This one word is underſtood to be a full and philoſophical explanation of the nature of all diſeaſes: it is a word which no one is aſhamed to uſe, which no one is able to define: wherever this vague word is uſed, cordials and ſtimulants follow of courſe, the moſt deſtructive preſcriptions, in any affection of the brain: Debility is ſpoken of as if it could exiſt without a phyſical cauſe, and nervous diſorders are treated of as having no eſſential nor phyſical relation to the ſtate of that organ, which is the ſource and centre of nervous energy. It is theories without knowledge, conjectures without proofs, diſeaſes without diſſections, conjectures ſubſtituted for facts; it is by the precipitate deciſion of genius, anticipating and deſpiſing all ſlow and ſerious inveſtigation, that the whole of this intereſting department ſeems like a dream, unworthy of the ſerious ſtudy of a ſober and thinking man.

How the importance of anatomy could be miſtaken, how it could be imagined that thoſe things might be conjectured which ſhould be ſeen and touched, it is not eaſy to conceive: "Without anatomy, what is medicine? its importance is indeed very ſlight." "Exilem majeſtatem obtinet medicina abſque anatomes ope." Anatomy, as uſually ſtudied, has been held in contempt by the moſt ſenſible and

learned men. " Non loquimur (ſays Muſitani) hic de anatome locali, nam ſecandorum corporum ſtudium plane puerile eſt. Diſſiccant vulgares cadavera, &c. Cæterum etiam loquimur *de anatomia vitali, quæ corporis morboſi accidentia meditatur*, et ſubjecti proprietatem novit, ſine cujus cognitione alias nullus eſt medicus, et ſic una eſt et vera anatomia, quæ ex dictis duabus progreditur *." " We ſpeak not of that anatomy which is converſant only with names and deſcriptions, and with the ſimple forms of parts, but of the anatomy of health and diſeaſe, of the properties of the body, and the appearance of morbid parts; without this, a phyſician is naught, and the common knowledge of anatomy without its uſe, which reſults from comparing together the properties of the healthy, and the appearances of diſeaſed parts." This alone is anatomy: this is the anatomy which belongs to the profeſſion, not to ſchools, which improves as we advance in practice, and becomes more perfect and more intereſting, in proportion as the minutiæ, by time and want of uſe, vaniſh from our recollection. This is the kind of anatomy, (viz. the inſpection of the cauſes of diſeaſe), of which I hope to make you feel all the advantages: Amuſing ſubtilties, and ingenious theories, are indeed independent on this knowledge; but there is no doctrine really uſeful, or, in other words, no general collection of facts to be attained in our ſcience, or in any other, without obſervation and labour. The facts about which you have to inquire, the philoſophy you have to attain to, conſiſt in the knowledge of thoſe peculiar ſtates of the brain, which accompany certain affections of the body; for the brain operates on all the body, and the diſorders of its circulating ſyſtem, by which theſe conditions of the organ are produced. By remarking the ſeveral ſtates of the organ, its diſorders may be defined according to their eſſential nature, and by reaſoning on the various ſtates of its circulation, and on the conſequences of its blood being accelerated or accumulated, they may, I believe, be prevented or cured.

ANATOMY OF THE BRAIN.

I AM not now to repeat what you muſt be acquainted with, the minute anatomy of the brain, the tubercles, the cavities, and the proceſſes of it; but to give you general and comprehenſive views of its ſtructure, and of the accidents to which it is

* Muſitani, page 115.

ſubject. I ſhall endeavour to give you right conceptions of the manner in which the various external and internal ſhapes and forms of the brain correſpond with each other; to explain to you the general nature of its cavities, the delicacy of its ſubſtance, the peculiarities in its circulating ſyſtem; to recapitulate that kind of anatomy which one engaged in practice would wiſh to know; to impreſs that general conception of the form and ſtructure of the organ which ought to ſurvive the minuter recollections. If you ever are to learn how to reaſon on the ſtructure, or diſtinguiſh the diſeaſes of the brain, it muſt be, not by ſchool-boy-like recollection of the names and appearances of individual and minute parts, but by forming for yourſelves manly, rational, and comprehenſive views of its general ſtructure, circulation, and functions. Nothing can be more deſirable, ſurely, than ſuch general views; nothing, I am perſuaded, more uſeful: Do not allow yourſelves to believe, that the anatomy of the brain, the forms of its cavities, prominences, or parts, will ever explain its office. The beſt uſe of anatomy is the practical ſcience of diſtinguiſhing the marks of diſeaſe; a ſcience moſt intereſting to humanity. But as for that ſpecies of philoſophy, to which men of all ages have been addicted, referring the ſeveral faculties of the mind to individual parts of the brain; imputing to the moſt trivial varieties of form, the moſt wonderful powers of the mind; it is a kind of materialiſm too groſs and contemptible to deſerve refutation, and leads to queſtions unfit for this place, ill ſuited to our faculties. But every ſtep of our inveſtigation will lead to this univerſal and important fact, with which you cannot be too early acquainted, viz. That the brain, in its own nature inſenſible, may be piece-meal deſtroyed, without the faculties being ruined; that no local injury offends; that the faculties are obſcured by ſuch cauſes only as affect the whole; that the ſlighteſt general injury produces the worſt ſymptoms, the moſt deſperate local injuries produce none.

OF THE DURA MATER.

The dura mater is like other membranes formed of condenſed cellular ſubſtance. It is the cellular ſubſtance to the inner table of the cranium, the nutritious membrane of the bone. It is as a ſecond ſcull, which, when the cranium is trepanned, or injured, continues to ſupport the brain. Its partitions, ſinking betwixt the hemiſpheres, and extended betwixt the brain and cerebellum, protect, ſupport, and ba-

lance the whole, and defend the ſeveral parts from undue preſſure. But it has no place in the circulating ſyſtem of the brain; in reſpect of circulation, it is connected only with the ſcull, which it nouriſhes; its ſurface, where it touches the pia mater, is moiſtened with a halitus, or exudation, like that of other cavities; but with the brain, it has no more connection, than the pleura which lines the thorax has with the pleura which involves the lungs.

The dura mater being firmly united with the ſcull, ſends down two lamellæ, the one a perpendicular plate, dividing the great maſs of the brain into two hemiſpheres: This is the falx, which, from the deepneſs of the brain towards the occiput, and its ſmallneſs towards the fore-part, is of the form of a reaping-hook, the blade of which is broad at its root, tapering towards the point. This perpendicular ſeptum dividing the brain, ſteadies it continually in all the various inclinations of the head, preventing the right hemiſphere of the brain from gravitating on the left. The tentorium, or vaulted proceſs of the dura mater, is another partition, differing in its direction, and in its effect; it lies horizontally over the cerebellum, and defends it from the preſſure of the brain; theſe ſepta ſupport the circulation, both by dividing the maſs of this organ, and by receiving and tranſmitting the veins; and they leſſen alſo the weight of the ſeveral lobes, and the dangers of concuſſion, by dividing them.

OF THE PIA MATER.

The Pia Mater, relating more immediately to the brain, delicate, vaſcular, conveying nouriſhment to the organ itſelf, is in every ſenſe more important. It alſo is compoſed of a cellular ſubſtance, but peculiarly delicate, and adapted to the ſoftneſs of the brain; from which ſoftneſs, and its immediate connection with the brain, it has its name of pia mater. This the more immediate membrane of the brain, is delicate, vaſcular, flocculent, and not only follows all the leſſer convolutions, and lines all the cavities, but plainly ſinks into the ſubſtance of the brain, carrying the blood-veſſels with it. It is juſtly compared by Galen with the chorion of the fœtus, or the meſentery of the perfect animal. When torn away, for it will not ſeparate, it tears along with it the ſubſtance of the brain: When we introduce the blow-pipe under it, we find the air penetrating into the ſubſtance of the brain: When exudation of ſerum, or extravaſation of blood, happens from veſſels under the pia mater, ſuch

exudation raiſes the membrane in ſmall cellular elevations, tucked in from point to point, like a quilted cuſhion, which ſhows us how cloſely the membrane and cellular ſubſtance are connected; they are indeed the ſame; the ſeparating of the pia mater from the brain, is like tearing the outer or peritoneal coat, from the inteſtines; what is cellular ſubſtance within any viſcus, is membrane where it is expanded over its ſurface. Long and delicate arteries, lodged in this cellular ſubſtance, creep along in the ſulci of thoſe inteſtine-like convolutions, which mark the ſurface of the brain. Theſe arteries are minutely and exquiſitely divided before they plunge into its delicate ſubſtance; and thoſe minute arteries, or at leaſt the veins which accompany them through the ſubſtance of the brain, are ſo numerous, that we ſee in a diſeaſed, eſpecially in an injected brain, upon the face of every ſection, innumerable ſmall gouts of blood, at regular diſtances from each other, as if the cut ſurface were dotted with bloody points. Thus does the brain appear a tiſſue of veſſels, proceeding from the pia mater, and ſupported throughout by a delicate cellular ſubſtance, inviſible but by the manner in which the ſubſtance of the brain is drawn out in threads and flocculi, when the pia mater is torn away.

The pia mater is peculiarly vaſcular, *firſt*, In the ſulci ſurrounding each convolution, for there the veſſels are divided in order to enter the ſubſtance of the brain. *Secondly*, Where, being inflected over the poſterior ſurface of the brain, it paſſes betwixt the brain and the cerebellum, and is named as if it were a diſtinct membrane, the VELUM INTERPOSITUM, for there the membrane, by inſinuating itſelf betwixt the brain and cerebellum, enters into the third ventricle of the brain, and covers parts which have been eſteemed important, viz. the pineal gland, the nates, and the teſtes. *Thirdly*, At each horn of the great lateral ventricle, it is alſo peculiarly vaſcular; for though the pia mater is every where continuous, though the covering of the brain, and the lining of its cavities, are one uninterrupted expanſe of membrane; yet it may be ſaid to enter into theſe cavities, by the horns of the ventricles, and by the back of the third ventricle; in each of theſe places, the membrane ſeems, as it were, to concentrate its vaſcularity in aſſuming a new office: Where the pia mater enters the horns of the great lateral ventricles, and eſpecially where it lies along the floor of theſe ventricles, its veſſels are ſo numerous, and its veins eſpecially ſo tortuous, that it reſembles ſomewhat the red and plaited appearance of a ſergeant's ſaſh; and this plexus, or net-work of veſſels, is named the Plexus Choroides. The veins are in theſe plexus, as in all vaſcular parts of the body, more conſpicuous; and ſome of the veins returning blood from the internal ſurfaces of the ventricles, and from the ſubſtance

of the brain, are ſeen livid through its pellucid ſubſtance: Theſe veins, riſing from the floor of the ventricle, join the plexus; and from the two plexus choroides, large veins run backwards towards the velum, or that part of the pia mater which is interpoſed betwixt the brain and cerebellum, where, finally, a great venous trunk is formed, named Vena Magna Galeni.

The Pia Mater thus univerſally involving the brain, is attached to the dura mater only along the line of the Falx and Tentorium: there the veins of the pia mater deliver their blood. The veins riſing from among the convolutions on the ſurface of the brain, run towards the falx, over the ſurface of each hemiſphere, and pour their blood, by many large branches, into the longitudinal ſinus, or great vein, which runs along the doubling of the falx. The blood of all the ventricles is delivered another way, viz. through the veins of the plexus choroides, into the vena magna Galeni. By the fulneſs of the veins on the ſurface,—by the appearance of the plexus and velum,—by the colour of the brain,—and by the more or leſs numerous dots of blood on its cut ſurface, we judge of the ſtate of vaſcular action which has prevailed within the brain before death *.

OF THE FORMS AND INDIVIDUAL PARTS OF THE BRAIN.

The maſs of the brain is divided by the Falx into two Hemiſpheres; by the Tentorium the brain is ſeparated from the Cerebellum; and each of theſe is ſubdivided again into leſſer Lobes, implying no peculiarity of function, but correſponding with the ſeveral copartments of the ſcull: for, the anterior, middle, and poſterior lobes of the brain, correſpond with the ſeveral concavities of the os frontis, the oſſa parietalia, and the os occipitis. That the brain is thus divided into brain and cerebellum, hemiſpheres, and lobes, is what I need hardly remind you of. In place of deſcribing theſe minutely, I ſhall attempt to convey a rational and general view of the whole. It would appear, that the ſurface of the brain is varied, and undulated; divided by deep grooves into little convexities, which (from the turns reſembling thoſe of the bowels) are called convolutions, chiefly to extend its ſurface, to multiply its points of contact with the pia mater, and to receive all its profuſion of veſſels. It would next appear, that the cavities of the brain, the lateral ventricles, larger than

* The pia mater is exquiſitely deſcribed by Galen, *De Uſu Partium*: "Vertugratia, tenuis meninx cerebrum ſtabilit ac tegit, et præterea vaſa omnia, quæ in ipſo ſunt, colligat; ſimilis enim eſt chorio fœtus atque animalis meſaræo."—Cap. viii.

is uſually ſuppoſed, are deſtined for no other purpoſe, than to extend its ſurface, to receive inflexions of the pia mater on that ſurface, and to diſcharge the blood of the ſubſtance and internal ſurfaces by the veins of the plexus choroides, and the vena Galeni. Hence it is provided by nature, that the cerebral ſubſtance, though apparently a globular maſs, is in truth all of one equable thickneſs * ; for the ventricles begin ſmaller at the anterior lobe of the brain, ſwell out in the middle or greater lobe, and decline to a point again in the poſterior lobe, thoſe pointed extremities of the cavities being named, the anterior and poſterior horns.

It would appear, that the forms of the inward parts are mere bulgings, neceſſarily depending on the external forms. The roof of the two great lateral ventricles is arched, uniform, and ſimple, correſponding with the uniform convexity of the brain. The floors of the ventricles are undulated, correſponding in their forms with the eminences which the conjunctions of the crura cerebri, the irregularities of the baſe of the ſcull, and the giving off of the nerves, create. If we turn up the brain from behind, where it lies on the Tentorium, and proceed to ſeparate it from the cerebellum, we find, that we tear our way into what is called the third ventricle, and we ſee its eminences, viz. the Nates, Teſtes, and Pineal Gland: but the third ventricle is in truth no cavity: Where the poſterior lobe of the brain reſts upon the cerebellum,—where the crura cerebri, and the crura cerebelli meet,—where the pia mater paſſes in the form of vaſcular velum betwixt the brain and cerebellum, there is naturally a triangular interſtice, but no cavity, for it is occupied by the velum, or moſt vaſcular part of the pia mater. Neither is it open, for, by the interpoſition of this membrane, the pia mater, or, as it is here named, the velum interpoſitum, the parts mutually adhere: As for the tubercles, viz. the tuberculi quadrigemini, the nates, and the teſtes, they are no more than the natural forms produced by the meeting of the crura cerebri, and cerebelli; the nates, or larger tubercles, being formed by the crura cerebri, the teſtes, or ſmaller ones, by the crura cerebelli. The pineal gland, a ſmall round tubercle of medullary and cineritious matter, is ſeated in the centre of theſe, covered and bound down by the velum, and only to be ſeen when that is raiſed, which muſt be done with delicacy, leſt it tear up the gland.

It is the continued courſe of the crura medullæ oblongatæ, lying ſide-by-ſide with each other, that forms that longiſh ſlit which we call the Fourth Ventricle, cloſed, as the third ventricle is from behind, by the pia mater. The hole, or Iter a

* "Omnibus igitur iſtis prominentiis (viz. convol. cerebri) correſpondet ventriculorum cavitas, &c. ita ut univerſum cerebrum ſit veluti inſignis quidam cortex ambiens predictas cavitates."—*Skenkius.*

Tertio ad Quartum Ventriculum, is juſt the circular opening formed betwixt the two crura cerebri, and crura cerebelli. The continued medullary productions of the brain, the Corpora Olivaria, and Corpora Pyramidalia, as juſt the ſwelling out of thoſe medullary matter into round and pyramidal bulgings, where the continued ſubſtances of the brain and cerebellum, viz. the crura prolongata, terminate in the ſpinal marrow.

The Thalami Novorum Opticorum, and the Pedes Hyppocampi; the ſwelling and bulging parts, whether of medullary or of cineritious ſubſtance, within the great cavities, called lateral ventricles, are neceſſary counterparts of the external forms; and correſpond with the ſhapes of the poſterior lobe of the brain, where it forms the cortex or ſurrounding ſubſtance of the ventricle, and with that of the crura cerebri, or extenſions of the medullary ſubſtance of the brain, where they firſt aſſume the form of crura. If you would have a general conception of the organization, look not to a vertical ſection of the brain in the dead body, for the parts cannot be fairly divided, and will not keep their forms or relations to each other; but look to a drawing of the vertical ſuture, that, for example, in my brother's plates of the brain, plate 7. where you will be able, after reading the deſcription, and comparing part, to familiarize your mind with theſe intereſting concluſions: That the energy of the brain, its relation both to body and mind, depends not on its form, but on its peculiar matter: That the powers and energy of the brain are continually regulated by the ſtate of its circulation; excited when its vaſcular action is excited; and deadened when its veſſels are oppreſſed. Examining, in this drawing of my brother's, the vertical ſection of the brain, you will perceive, from the deeper colour of the cineritious or cortical part, that it is more vaſcular; this peculiarity of colour we know to be from its vaſcularity, for, from grey it changes to green, and livid in the ſuppurating or inflamed brain, in conſequence of the turgid ſtate of the inflamed veſſels, or of actual extravaſation of blood. In the medullary, or white ſubſtance, you will obſerve in every ſection large and numerous gouts of blood, which are ſections of the veſſels, yet undivided, and going towards the cineritious or cortical part. You will perceive, that for the purpoſe of extending the vaſcularity of the brain, nature has extended the ſurface; that it is hollow, —that the pia mater, which covers the convoluted ſurface of the brain, paſſes into its cavities, and is there more vaſcular; that theſe cavities, far from being ſmall, or their parts difficult of inveſtigation, are extremely large, and environed ſo by the ſubſtance of the brain, that the brain is (to uſe the expreſſion of

Skenkius) " veluti inſignis quadam cortex ambiens predictas cavitates." Thence all parts of the brain are equally near to ſome ſurface, by which the veſſels of the pia mater may furniſh blood; and thence the floor of the ventricles return as large veins to the ſinuſes of the occiput, (viz. the vena magna Galeni, and its branches), as the external ſurface does to the great longitudinal ſinus. You thus perceive, that the brain, which ſeems a great and ponderous maſs, of unequal bulk, having ſmall, big, and middle lobes, is yet a ſubſtance of uniform thickneſs, for the lateral ventricles are larger in their centre, when the maſs of the brain is large, and ſmall towards their extremities, where the anterior and poſterior lobes are ſmall. Thus do the great lateral ventricles equaliſe the ſubſtance of the brain, and reduce it, notwithſtanding its irregular outward form, to one thickneſs of ſubſtance. The openings of theſe ventricles admit the vaſcular membrane, which is to line the internal ſurfaces of the brain, while the leſſer cavities of the third and fourth ventricles are ſtill more cloſely lined by the ſame vaſcular membrane, and all ſimilar interſtices left by the ſmall parts of the brain, where they touch and adhere to one another.

Contemplating the vertical drawing, you will ſo follow the great outline with your eye, as to refer each internal form in the ventricles of the brain, to the external bulgings. You will find the Tuber Annulare, the Tuberculi Quadrigemini, and Corpora Olivaria, and Pyramidalia, to be merely the bulging forms created by the junction of the crura cerebri, and the giving off of the ſpinal marrow; and thus, while you learn to eſtimate this organ according to its peculiar nature, and explain its conditions and aptitudes, according to its original conſtitution, and the ſtate of its vaſcular actions; you will begin to ſuſpect, that thoſe marked parts of the brain, ſo long the ſubject of contemplation with phyſicians and philoſophers, have no very peculiar diſtinction, but are accidental only. How can it be that cavities, which are ſo obviouſly deſigned for extending the ſurface of the brain, ſhould be laboratories of faculties; that memory, imagination, and judgement, ſhould have diſtinct reſidences; that the pineal gland, or other tubercle, ſhould be pre-eminently the ſeat of the ſoul itſelf, as if the ſoul were a material and definable exiſtence, when theſe very parts are not more curiouſly or perfectly formed in man, than in the ox at the ſtall.

OF THE SENSIBILITY OF THE SUBSTANCE OF THE BRAIN.

By diverting, for a little while, your attention from certain experiments of philofophers and phyfiologifts, defigned to extort from the fufferings of animals, proofs of the fenfibility of the brain, by directing your attention rather to the plain broad facts which the wounds occurring in war and battle, or even the ordinary accidents of life, prefent to the furgeon; I am fure, I try this great queftion by the teft of common fenfe, and open it in the way moft advantageous for you, by laying before you facts and views unequivocally and practically ufeful. The furgeon is accuftomed to fee deep wounds, and ftill deeper ulcerations of the brain, producing not the flighteft effects on the mind, and hardly affecting even the body. Were he for a moment to doubt his fenfes, and truft to his reafon,—to fuch reafoning, at leaft, as that which defcribes the brain, the material configuration of the brain, as the organ of the foul, or its feveral prominences and hollows, as the diftinguifhed feat of its various faculties,—he muft be abforbed in wonder and amazement, at feeing men killed fometimes by a blow of the fift, yet hardly affected in cafes where weapons, or fractured bones, have pierced deep into the brain; and ftill more muft he continue amazed, to fee the actual fubftance of this reputed organ of the foul undergoing fuch fuppuration as other parts fuffer, and healing like them.

Philofophers have never had the modefty to queftion for a moment the convenient opinion they had conceived, viz. that the brain, to which every act of volition and fenfation feems to be referred, was itfelf endued with exquifite fenfibility. This was firft denied by practical furgeons: Long before Haller, or his illuftrious pupil Zin, had begun to think about the fenfibility of the brain, Wifeman, who had, during the civil wars of England, witneffed all variety of wounds, declared in one plain blunt word, that the "brain was an infenfible body." This he had learnt from vifible and tangible proofs of the fact, not by experiments on dumb animals, which are to howl their fufferings, but by wounds in men, who could exprefs what they felt; but what is moft furprifing, men fatally wounded have, in many inftances, had no fufferings to defcribe, and have retained every power and faculty of mind and body, even when the brain was deeply injured by weapons. It is no paffion for the marvellous, that has induced authors of the higheft reputation to ftate this fact in every variety of fhape;—their fenfes could not always be deceived; they could not always imagine falfely, that they handled at each

dreſſing the very ſubſtance of the brain. They could not pledge their good repute on a fact at all doubtful, eſpecially when in direct oppoſition to every prejudice. But, indeed, ſuch facts ſeem incredible, only becauſe, like many valuable diſcoveries, they are oppoſite to all our pre-conceived notions. "The enemy (ſays Wiſeman) having driven in our out-guards at Truro, they continued purſuing them; and a trooper wounded between the right brow and the ear, ſpying me in the crowd, importuned me earneſtly to dreſs him, and would admit of no excuſe. We ſtopped at an apothecary's houſe, on the right hand going out of the town towards Perin; I called to the apothecary's ſervant to bring ſomething to dreſs him; meanwhile I haſtily lifted up the bloody hair, and ſaw a quantity of brain lie amongſt it. I took it up with my fingers, and ſhewed it him, the ſight whereof ſo calmed his paſſion, that I had liberty to flee from the enemy, who had entered the town*." "In battles and ſieges of towns, (adds Wiſeman), we meet with many ſuch wounds; after extracting the pieces of the fractured ſcull, we dreſs up the brain and membranes with a ſyndon of ſilk, or of ſoft linen dipped in a warm digeſtive. Though ſurgeons have pretended to dreſs the brain with one kind of medicament, and the membranes with another, that is not poſſible to be done. In the care of theſe wounds, *the brain I conſider as an inſenſible body*, and the dreſſing of it conſiſts in keeping it within its membranes; if this can be done, as in ſmall wounds of the brain it doth ſometimes happen, then the patient may recover †."

Such opinions, expreſſed by practical men, who make their appeal to their daily experience "in battles and ſieges," muſt impreſs your minds a great deal more than the moſt ingenious experiments, for they are imagined for a preconcerted purpoſe, and executed with addreſs favourable to that purpoſe. But when we reflect on the infinite variety of ſuch proofs, produced by practical authors of all ages and na-

* Wiſeman, p. 187.

† "At the ſiege of Melcomb-Regis, a foot-ſoldier of Lieutenant-Colonel Ballard's, by the grazing of a cannon-ſhot, had a great part of his forehead carried off, and the ſcull fractured into many places, and ſome of it driven with the hairy ſcalp into the brain. The man fell down as dead, but after a while moved; and an hour or two after, his fellow-ſoldier ſeeing him endeavour to riſe, fetched me to him. I pulled out the pieces of bones and lacerated fleſh from amongſt the brain, in which they were entangled, and dreſſed him up with ſoft folded linen, dipped in a cephalic balſam, and with emplaſter and bandage bound him up, ſuppoſing I ſhould never dreſs him any more. Yet he lived ſeventeen days; and the fifteenth day walked from that great corner-fort over againſt Portland, to the bridge which ſeparates Weymouth from Melcomb-Regis, only led by the hand of ſome one of his fellow-ſoldiers. The ſecond day after he fell into a ſpaſmus, and died, howling like a dog, as moſt of thoſe do who have been ſo wounded. About the ſame time, a maid-ſervant was ſhot into the right ſide of her head by a muſket-bullet deep into the brain. She lived ſo long, till that lobe of the brain wrought out or corrupted."

tions, by thoſe among whom no colluſion could be ſuſpected, we cannot refuſe an unqualified aſſent to this concluſion of Wiſeman, that "the brain is but an inſenſible body;" and there is a ſort of conviction ariſing from narratives by one or two good authors, ſo much more perſuaſive than that ariſing from the moſt ample catalogue of facts and creditable names, that I cannot refuſe myſelf the pleaſure of ſtating a few other caſes.

" * Balthaſar Brem, a robuſt young man of twenty-ſeven years of age, reeling home tipſy from a fair, was, after various quarrels, wounded in the temple with a halbert, the wound extending nearly from the eye to the ear, and penetrating the temporal bone, ſo as to admit the point of the little finger. He walked half a mile to the village of Groſſelſingen, when the bleeding was ſtemmed by ſome charm; and from thence he walked to another village, Allerheim, three miles farther, and ſat down again in a tipling-houſe. He was thus wounded on the 24th of June; on the morning of the 25th, when in his maſter's houſe, he was proceeding very imprudently to waſh his wound with cold water; he was diſſuaded, but could not be prevailed on to think ſeriouſly of the wound, or go to a ſurgeon. At laſt he went to a quack, who cloſed the wound with a ſimple plaſter, boaſting, that during ſix years in which he had followed the army, he had ſeen worſe wounds heal without the ſlighteſt ill conſequence. On the 26th, he complained of pain in the neck, back, and loins, which, however, were relieved by gentle friction. On the 27th, he return-

* *CAPITIS VULNUS AD CEREBRUM PENETRANS.*

" Balthaſar Brem, Oſtheimenſis in principatu Oettingenſi, juvenis robuſtus 27. annorum, die 24. Junii 1682, ex nundinis Nordlinganis, non procul ab urbe, ebrius, ob lites in via obortas, bipenni in tempore dextro prope angulum minorem oculi vulneratus fuit; vulnus inflictum pertigit fere ad aurem uſque, ac deprehenſum fuit os temporum perforatum fuiſſe, ut apicem parvi digiti admiſiſſet. Vulneratus ad pagum Groſſelſingen, dimidio milliari a loco pugnæ diſtantem, properavit, ac ſanguinem ſuperſtitione quadam ſiſtere curavit, indeque ad pagum Allerheim, prope per milliare Germanicum, pedes ivit atque ibidem in hoſpitio rurſus bibit. Die 25. Junii, mane, in ædibus domini ſui vulnus frigida cluere voluit; monitus a lotione, deſtitit; interea vulnus parvi pendens vix perſuaderi potuit, ut chirurgi ope uſus fuiſſet; tandem adiit balneatorem, qui vulnus ſimplici emplaſtro operiit. Jactabat ſe graviora vulnera, dum per ſex annos militiam ſequebatur, ſine damno perpeſſum fuiſſe, nec tantillum ſibi obſuturum. Die 26. Junii, conquerebatur de dolore cervicis, dorſi et lumborum, quamprimum partes iſtæ leviculæ linteo fricabantur, agebat ſe melius habere. Die 27. Junii, Oſthemium adiit, ac paternas ædes repetiit. Die 28. Junii, magis delirabat, ac ſitus corporis abſurdos ſuſcepit, ſine convulſionibus; quamprimum enim ſpina levicule rurſus perfricabatur, quietus jacuit, beneque compoſitis artubus. Nunquam vomuit; nemo adſtantium mortem timuit, cum ſemper vegetus admodum appareret. Quotidie vulnus a peritiore balneatore deligabatur; vulnus nullum pus hucuſque fudit. Die 29. Junii, mane, tribus horis placidiſſime dormire videbatur, verum his elapſis, non amplius evigilavit, et reſpirare deſiit.

" Die 30. Junii, Exc. D. D. Amadeus Megerlin Sereniſſimi Principis, ac Domini Alberti, Principis Oettin-

ed to his native village to his father. On the 28th, he became delirious, and twifted himfelf with ftrange contortions, but without any convulfion; and again, when the courfe of the fpine was gently rubbed, he lay quiet, and in the moft natural poftures. He vomited none; his friends were in no degree aware of his danger, and leaft of all apprehenfive of fudden death, for he feemed frefh and healthy. The wound was daily dreffed by another and a better *barber*; no pus had as yet been difcharged from the wound; when, on the 29th, while he feemed for three hours to be in a quiet fleep, his friends, upon approaching his bed, found him dead.

genfis Archiater cum chirurgo caput aperuit; dum olla cranii aufferebatur, multum cruoris nigri, fætidi et fluidi, in dextro latere emanavit; illa ablata deprehenfum fuit cufpidem bipennis per meninges in fubftantiam cerebri penetraffe; meninges erant mucofæ, et fubftantia cerebri circa vulnus flaccida et fufca; neque in ventriculis, neque in occipite grumos fanguineos aut alium humorem peregrinum invenerunt, quamvis præcipue de dolore cervicis ad lumbos ufque diffufo vivus adhuc conqueftus fuiffet. Poft obitum, caput, truncus, fcrotum, et artus, valde intumuerunt.——*Ex communicatione Excell. D. D. Megerlini Oettingæ, die* 1. *Jul.* 1682.

SCHOLIA.

I.

" Graviffimo huic vulneri per os temporis, meninges in fubftantiam cerebri penetranti nulli capitis dolores, nullæ convulfiones et diu nullus fopor fupervenit, quamvis intra cranium cruor cum ichore putrido jamque fætente fluctuaret, quia per vulnus ichori aliquis exitus patuit. Ob eandem caufam pedes aliquot milliaria Germanica confecit, vulnus fprevit atque neglexit, cum in reliquo cerebro fufficientes fpiritus animales conficerentur, liberque aditus in nervos pateret.

II.

" Delirare cœpit jam die tertio, quia non folum cruor, fed etiam fubftantia cerebri, cum meningibus corrumpi inceperunt; die quinto incrementa fumfit delirium, quod ex abfurdo fitu patuit, et falfa perfuafione dolorem cervicis, dorfi et lumborum fola frictione, etiam blandiffima, demulceri et evanefcere; quamvis forte negari non debeat illum vere doluiffe, ichore tenuiore per oftium facrum in fiftulam medullæ fpinali dicatam illabente, qui, feu humor peregrinus, molefliam peperit etiam quantitate paucus; nihil enim cruoris in occipite repertum fuit.

III.

" Sopor profundus die fexto fupervenit, quia portiones tenuiores ichoris corrupti per laceram cerebri fubftantiam fe profundius, et ufque ad medullam intimiorem immerferunt, fubfequente hora tertia finita apoplexia et morte.

IV.

" Forte fervari potuiffet, fi cruori liberalior exitus paratus, et vulnus curiofius deligatum a chirurgo perito fuiffet: Sic Romæ 1646, menf. Dec. vidi ab Excell. D. Nicolao Larche Lotharingo os temporis fractum terebra perforatum, fanguinique effluvium conciliatum fuiffe; cavebatur ftudiofe, ne aer frigidus ad cerebrum penetraret, ac linteolum fericeum intrudebatur ficcum, aliudque pauxillo melle rofaceo illitum, tegebaturque emplaftro de betonica, fimulque imperabatur victus ratio tenuiffima; quibus diligenter obfervatis æger convaluit.

V.

" Poft obitum, collum, truncus, artus, et fcrotum admodum intumuerunt, ut in fuffocatis et ftrangulatis fieri folet, fanguine copiofo in vafis fermentante, ac in fpatia fubcutanea mufculorum aliaque partium mollium effufo.

" On the 30th of June, the head was opened. Upon tearing away the ſcull-cap, much black, fætid, and very liquid blood, iſſued from the right ſide, and the halbert was found to have penetrated through the membranes into the ſubſtance of the brain. The membranes were in a ſtate of ſuppuration, and the ſubſtance of the brain was flabby, diſcoloured, and browniſh."

" A tailor (ſays Meekren), named Bernard Weghuyſen, was ſo wounded on the right parietal, that many fragments of the bone penetrated not only through the membranes, but even to the ventricles of the brain, a fact of which many, at the opening of the body, were witneſſes; yet this man walked home unaſſiſted. By the order of the magiſtrates, and the requeſt of his hoſt, I went to viſit him; and with the help of proper inſtruments, we extracted from the depth of the brain, from its central parts, a piece of the cranium nearly three inches long, beſides various leſſer fragments. This man, who was put into our hands on the 23d of February, died the 11th of March; and from the day we firſt viſited him, to that immediately preceding his death, there flowed daily through the wound a ſpoonful of the very ſubſtance of the brain, his ſpeech, intellect, and judgement, being all along perfect; nor was it till death was faſt approaching, that the delirium, fever, palſy, or other ſymptoms, came on *."

* " Bernardus Diderici Weghuyſen, ſartor, gravi læditur ictu dextro oſſe parietali, ſic ut fragmenta varia cranii vulnerati non ſolum meningem duram, tenuemque læderent, ſed et ad ipſas uſque ventriculorum cerebri cavitates ſe dimitterent, et quidem vehementia ſumma, uti in aperto poſt mortem cadavere ſpectatoribus notare licuit.

" Vulneratus domum petit, nullius auxilium implorans; juſſu ampliſſimi magiſtratus civitatis noſtræ, rogatuve hoſpitis, eum acceſſi; cujus ex cerebri interioribus incredibilis magnitudinis particulam a cranio læſo ſeparatam, præter fragmenta alia minora, inſtrumenti commodi beneficio extraximus. Artis noſtræ ſtudioſis veram fragmenti dicti quoad figuram et magnitudinem delineationem exhibere valde conveniens ducimus, eſt ea quam hic damus.

" Die 23. Februarii, curæ noſtræ commiſſus æger prædictus qui 9. Martii obiit. Conſideratione noſtra dignum quam maxime in hoc ægrotante, quod ſingulis diebus, a tempore eo quo ipſum acceſſimus, uſque ad diem mortem penultimo præcedentem, ſubſtantiæ cerebri quantum cochleari contineri poterat per vulneratum locum effluxerit, loquela, ingenio, judicio, integre ſe habentibus. Aſt inſtante ut diximus morte, febris, delirium, hemiplegia, inter alia ſymptomata, ſuperveniebant.

" Materiæ huic, quæ expreſſionis hiſtoriam, variaque ſymptomata, exhibet, antequam finem imponamus, conſultum omnino cenſemus exemplum priori ſimile, aſt cujus terminus longe felicior, hic proponere. Chirurgus hujus loci eximius Bernardus Heems, cujus curæ commiſſus æger, quique mediorum convenientium opera priſtinæ valetudini cum reſtituit, ejus nobis copiam fecit, literis ea de re ſcriptis, inſcriptiſque nobis.

AMICISSIME,

Cum conſtet, rerum variarum, rarius occurrentium, perſcrutatorem te eſſe, arctaque jam a multis annis nos junxerit neceſſitudo, intermittere haud potui, quin ſingulare ſingularis fracturæ cranii in puero 10 aut 12 an-

A caſe is related by Fallopius, of a boy, the ſon of one Peter Wartz, who had his occipital bone ſo fractured by the falling of a window-ſaſh, that the edge of one piece of bone was depreſſed within the other, and there was left no exit for the matter. Severa points of the bone were driven through the dura mater into the ſubſtance of the brain. In pulling out theſe ſpiculæ, the ſubſtance of the brain was ſo lacerated, that at each dreſſing, the ſurgeon took away as much of its proper ſubſtance, as would fill a walnut-ſhell; and on the 3d day, he took away three ſpoonfuls, and all this without the ſlighteſt injury to the mental powers, which continued perfect, though the wound was ſuch as could not but prove mortal. The patient died on the ſixth day *. I will not allow myſelf to dwell upon theſe facts, nor even to tranſlate a ſimilar example annexed to it by Tulpius, but proceed to preſent to you one or two examples, ſuch as may ſerve to prove this univerſal fact, "That the intellect or ſenſes are but little affected by the moſt horrible, the moſt fatal injuries of the brain, if only ſuch injury be local."

A caſe which I mentioned in my Anatomy of the Arteries of the Brain, I will here venture to repeat; none can be more intereſting, nor prove more directly this general theory: "A young married woman, carrying in her arms her firſt child, then about ſix months old, ſlipped her foot, and was ſenſible of a ſlight ſhock, which reverberated through her head; but, as this happened on plain and even ground, ſhe did not fall down. She was inſtantly ſenſible of a pain in the right ſide of her head; it was ſo diſtinct and circumſcribed, that ſhe imagined ſhe could touch and cover the particular ſpot with the point of a finger. This pain, though lightened at intervals, never left her to the hour of her death. She was able to walk home, carrying her child; ſhe attended to her little family-matters, and continued to give ſuck; but, on the evening of that day, was ſeized with ſickneſs, not violent, like that of any febrile diſeaſe, but gentle, like the eaſy vomiting of a pregnant woman."

norum, ex caſu gravi, inductæ, tibi communicem. Frontis hic os, aliis coronale dictum, læſum adeo, ut particula quædam ſeparata, quæ et meninges vulnerabat et cerebrum ipſum, præterquam quod externa capitis integumenta vulnus exhiberent inſigniter amplum. Locus læſus ſubſtantiæ cerebri notabilem quotidie exhibebat quantitatem, quam vel ipſe, præter chirurgos alios, non ſemel inſpexiſti. Nec vomitus, nec delirium, nec ſanguinis per nares, aures, aliave loca, fluxus in ægrotante hoc unquam obſervabantur, inſignis licet amplitudinis apertura, reſtitutus brevi æger. Conſiderabilem hunc caſum tibi publicoque haud invidere placuit. Vale.

Bernardus Heems."

* Tulp. lib. i. obſ. 1.

"She continued ſick for two days, with ſlight headach, but ſtill was out of bed all day long, went about her houſehold affairs, and had no ſingle ſymptom which ſhould have led us to ſuſpect the fatal nature of the accident which had happened. During the night of that day in which the accident happened, ſhe got up, to reach for ſome cooling drink, which ſhe had placed beſide her, but felt extremely giddy, was obliged to ſupport herſelf by a cheſt of drawers which ſtood by her bed, and went immediately to bed again. On the evening of the 2d day, ſhe got out of bed, made tea as uſual, remained out of bed during the evening, and had no complaint except the continual ſickneſs, a ſlight pain of the head, and giddineſs ſtill ſlighter; ſhe expired during the night. Her pulſe all along beat low and weak, never faſter than ſixty in the minute.

"When I was brought to open the body, I had heard nothing of the pain in the head, which, though ſlight in degree, was fixed and conſtant; without a knowledge of this circumſtance, with nothing to direct me to the ſeat of diſeaſe, the ſymptoms preceding her unexpected death could not be otherwiſe than perplexing. *Firſt*, The ſudden ſlipping of the foot, and the continual ſickneſs which enſued, ſuggeſted the ſuſpicion of hernia; but no ſuch complaint had ever been diſcloſed to her relations; and, upon opening the abdomen, no concealed nor obvious hernia could be found. *Secondly*, We were informed of a palpitation to which ſhe had been ſubject, but of this ſhe had complained chiefly about the period of her firſt menſtruation, and for ſome years preceding her marriage; the palpitation appeared to have been hyſterical, yet, upon opening the thorax, the heart was found greatly enlarged, and crammed with dark and grumous blood. But, *thirdly*, A new ſcene opened to us, when the head was diſſected, and it appeared, that the enlargement of the heart, like that of the liver, which ſo often accompanies concuſſion of the brain, had ariſen from the languid action of the heart, and that torpor of the whole ſyſtem which characteriſes the ſtate of coma. I now was, upon retiring from the diſſection with the relations, informed for the firſt time, that the ſudden ſlipping of the foot, had been followed by a pain almoſt as ſudden in the head; that it was pointed, limited to one ſingle ſpot, inceſſant, accompanied with continual vomiting, or deſire to vomit, and with giddineſs during the night. Upon opening the head, I found the dura mater of a very unuſual appearance, livid, or rather of the colour of the gizzard of a fowl, with green and changing colours. Having cut it up, the pia mater appeared like red-currant jelly, with freſh coagulated blood, ſo firmly attached to it, that it ſeemed as if injected into its very ſubſtance, and incorporated

with it *. Upon cutting and tearing up the pia mater, each convolution of the brain was ſurrounded and ſeparated from that next it by coagulated blood. Upon cutting into the ventricles of the brain, that of the right ſide was found to contain four ounces of pure and coagulated blood; the opening of the cavity preſented at firſt view the ſame appearance as if we had opened one of the auricles of the heart; the blood was very dark, and very firmly coagulated, and was ſpued out from the cavity by the preſſure of the ſurrounding parts; the coagulum became gradually firmer and whiter as we traced it inwards, till it terminated in a white and ſtringy clot, which ſtuck about the mouth of one of the branches of the middle artery of the brain."

Thus we perceive, that deep and deadly wounds, or even burſting of the arteries of the brain with great extravaſation, affect the intellect very ſlightly; and you muſt well remember, that in all my deſcriptions of ſuppurating brain, both in thoſe who ſurvived, and in thoſe who died, I mentioned no more formidable ſymptoms, than a ſlight confuſion of head, unuſual terrors during ſleep, a ſlight trembling of the hands and knees †. Not only were ſuſpicions raiſed of the brain being "an inſenſible body;" practical ſurgeons had anticipated, by actual obſervation, the cruel experiments of phyſiologiſts: but though the ſurgeon, (with every advantage of an intelligent ſubject, whoſe powers of mind remained often uninjured, after the moſt dreadful wounds), had long aſcertained the inſenſible nature of the brain; yet has the phyſiologiſt moſt unrelentingly perſevered in the inquiry; not a reptile that has limbs to quiver under torture, not a creature that can howl its ſufferings, but has been made the teſt of the ſenſibility of the brain. We cannot refrain from taking a lively intereſt in theſe experiments, and cannot but rejoice that they have been performed, never, I hope, to be repeated; they have been done with perfect accuracy by Zin, the favourite pupil of Haller, and with a ſavage deliberation, which makes the blood run cold, in following the ſeveral ſteps of the proceſs. Every part of the brain, diſtinguiſhed by any thing peculiar in its form or colour, has been imagined to be the peculiar ſeat of ſome faculty, if not of the ſoul itſelf, from the centrum ovale, or great medullary maſs of the brain, to the pineal gland, its moſt inſignificant particle, "where the ſoul has taken up her reſi-

* Obſerve, that this is the appearance I meant to intimate, when ſpeaking of the cellular nature of the pia mater, and of its connection with the ſubſtance of the brain.

† See the caſes of Sharp, and of the ſoldier-lad Bennet, p. 353. 425.

dence, and ſits dabling like a tad-pole all day long, winter and ſummer, in a puddle*." The centrum ovale, the corpus calloſum, and the cerebellum, which are the great medullary maſſes; the corpora ſtriata, the nates and teſtes, and the pineal gland, which are the particular forms of leſſer parts or prominences of the brain, have been ſucceſſively affirmed to be each the ſeat of the ſoul. Vieuſſens believed that the ſoul, reſiding in the whole brain, had the ſimple ideas from the various organs of ſenſe firſt impreſſed upon the corpora ſtriata, and finally recorded in the centrum ovale. Perault believed the ſoul to be univerſally diffuſed through the nervous ſyſtem. Deſcartes believed it to be concentrated in the pineal gland. Blanchard placed it in the ſpinal marrow. The ſoul, as Zin tauntingly remarks, has been, by every new ſpeculator, driven from her old dwelling, to ſeek for ſome convenient reſting-place; from point to point, it had been driven into the corpus calloſum, or great medullary commiſſure of the brain, and thence it was finally driven by Zin at the point of the trocar down through the infundibulum, altogether out of the brain.

Zin, in one great and concluſive experiment, tried the ſenſibility of each ſeveral part and portion of the brain: He fixed a big dog upon his table, and, having perforated the ſcull with the trepan, ſcraped the dura mater, and pricked, with the point of the ſcalpel, that membrane, in which chiefly was ſuppoſed to reſide the ſenſibility of the brain, and of all the membranous parts of the body, but with ſo little appearance of exciting ſenſation, that he believed the dog apoplectic, till, upon irritating the flaps of the diſſected ſkin, he howled loudly. Next he tried the ſenſibility of the brain itſelf; he puſhed his probe deep into the cortical ſubſtance of the brain, and tortured that portion in various ways, but not a ſtruggle enſued. He puſhed his probe deep into the medullary ſubſtance of the brain, then the dog howled, but was not convulſed; he went about the chamber tottering as if drunk or ſtupid. Again he ploughed the probe deep into the brain, and the dog howled again, went ſtaggering about the room, and in a few minutes began to run round in circles like a mill-horſe, ſtaggering and falling from time to time, but riſing always, and running round again. Soon after, the creature fell down all at once: being ſet upon his feet, he could no longer ſtand: his body, when laid upon the table, was curved to one ſide by paralyſis; being whipped, he howled. We are ſoon after relieved from the horrors of this detail; after drawing ſome long breaths, (ſays Zin), the creature expired: "Brevi, poſt profundas reſpirationes, moritur." In this, and other mercileſs experiments, each individual part of the brain was injured, irritated,

* Sterne.

or deſtroyed, without the remoteſt proof of the individual reſidence of the ſoul in one part, or of its ſeveral faculties in its ſeveral parts: From every experiment, from every accidental wound, it has appeared, that its ſubſtance is inſenſible, the ſhape and form of its parts accidental, and importing nothing; its qualities apparently the ſame in man and animals. The phyſiologiſt cannot but acknowledge the ſame perfect forms, the ſame obvious ſtructure, the ſame proportions of cortical and cineritious ſubſtance, the ſame influence over the ſtomach, and over muſcular motion, the ſame reference to all the ſenſes in animals, as in man; and the philoſopher of the ſchool of materialiſm muſt be forced to acknowledge ſome eſſential diſtinction betwixt man and the lower creatures, which matter, or its laws or properties, never can explain. The palate, the noſe, the ear, are not more perfectly formed in animals than the brain.

What does this mean, or what does it imply? That the brain, whoſe connection with the ſenſes, and whoſe dominion over the whole ſyſtem is ſo ſtrikingly obvious, ſhould be wounded with weapons, pierced with inſtruments, waſted by ulceration, diſordered by extravaſations of blood, without any of thoſe immediate conſequences which we are naturally led to expect? One fact, at leaſt, and fairly worth all the others, is proved, viz. that no partial injury affects the ſenſes, the intellect, or the vital motions; that the injury which is dangerous, is that which affects the whole organ. It is this which marks the difference betwixt wounds and bruiſes, falls and blows. A wound affects a part only; a ſhock, or fall, affects the whole; and it is only when partial injury terminates in general oppreſſion, that life is in danger. When Zin ſtruck his trocar through the ſcull into the brain, or cerebellum, the dog ſuffered only a temporary diſorder; there appeared no want of vigour, though the head remained thus transfixed, and he lived ſometimes till morning, little affected, and free from pain; but the moment the trocar was withdrawn, when blood from the arteries, or the ſinuſes, diffuſed itſelf upon the brain, he fell, became inſenſible, and ſoon expired *. Thus we often find a patient wounded deeply in the brain with weapons, or fragments of the ſcull, able to walk to his ſurgeon to have his wound dreſſed; while thoſe injured by a ſhock, or knocked down with a blow of the fiſt, fall down inſenſible, never to riſe again. This leads me to a concluſion every way worthy of your notice: The ſhort parallel which I am now going to lay before you, will direct your attention from local injuries, to the general condition of the organ; for whether a man lies torpid from diſeaſe, or from a blow,

* Vid. Zin, p. 445.

ſtill you are to reflect on the ſtate of the arterial circulation within the brain. *Firſt*, You may be aſſured of this truth, which I hold myſelf bound to prove to you by innumerable facts, that the mere depreſſion of the ſcull, much as it has occupied the thoughts of the ſurgeon, affects but very ſlightly the functions of the brain. *Secondly*, You have ſeen one, and I ſhall have occaſion to ſtate many caſes, in which the moſt profuſe extravaſations of blood have not produced torpor or coma. If, by either of theſe cauſes, the brain ſuffers, the worſt ſymptoms are ſtupor, and a ſlow pulſe; theſe injuries are local; they are merely oppreſſions to which the variable ſtate of the circulation within the brain accommodates itſelf; ſome blood is diſlodged by ſuch outward preſſure, and leſs is propelled into the head, and the moment the preſſure is removed, the function is reſtored. But, *thirdly*, Theſe cauſes are external merely; though they oppreſs in ſome degree, they do not injure the organ. If the patient lies inſenſible before the trepan is applied, it often happens, that as ſoon as the blood is let out, or the bone raiſed, he opens his eyes, mutters, and ſpeaks; knows his friends around him, and ſtirs the paralytic ſide. On the contrary, when the diſorder is within the organ,—when the extravaſation is not upon its ſurface, but within its ſubſtance,—when the arteries are in high action, its veins dilated, its cellular ſubſtance filled with ſerous or bloody exudation,—when its circulation is ſuffocated, and the whole ſtate of the organ reſembling that of a bruiſed and gorged limb,—the patient lies in that profound ſtate of oppreſſion, which is named Concuſſion, when ariſing from a ſhock, Apoplexy, when ariſing from other cauſes. The ſenſes are quite oppreſſed, the face full and diſtended, the jugulars manifeſtly dilated, the patient breathes ſlow and hard, with dilated noſtrils, and protruded lips, from which the breath is delivered in burſts, with that loud noiſe which marks what we call the ſtertorous breathing; and in no long time, the pulſe falls as low as fifty in a minute: The extremities are cold, the temples bedewed with a clammy ſweat, the bladder and rectum paralytic, ſo that the patient paſſes his fæces and urine unconſciouſly before he dies. From local cauſes of oppreſſion the brain may eſcape, becauſe of its variable ſtate of fulneſs: but, its own diſordered circulation acts irreſiſtibly on each particle of the organ, and the ſlighteſt oppreſſion of this kind is more fatal to its ſtructure, than the greateſt apparent injury. The ſenſibility and other properties of the organ are ſubjects of inquiry far leſs intereſting to the practitioner, than the ſtate of circulation within the brain itſelf.

OF THE CIRCULATION WITHIN THE BRAIN.

WHATEVER are the powers or properties of the brain, that influence, and these properties, are maintained in a peculiar manner by the circulating blood: —by a well-regulated ſtate of the circulation the function of the brain is ſupported, by an increaſed circulation it is excited, but as ſoon as the veins of the brain are no longer capable of tranſmitting freely the blood brought by ſuch high arterial action, the circulation is ſuffocated, and the brain oppreſſed: Surely, when the ſenſibility of the body, the power of the muſcles, the activity of the ſenſes, and the operations of the mind, are ſuſpended, we are entitled to ſay, the brain, the ſource of feeling and motion, is oppreſſed. We reckon not upon the form of the parts, as contributing to particular faculties; nor do we affect to underſtand in what peculiar conformation of the nervous matter its peculiar properties reſide, but affirm, from palpable facts, that the ſimple properties of the brain eſſentially depend on the circulation within the organ, and vary as it varies; ſo that we do not run, nor ſtoop, nor laugh, nor cough, without feeling a change and confuſion in our ſenſations. The brain incloſed within the firm unyielding bone, is not like the other parts of the body, whoſe exceſſive circulation can be more eaſily ſuffered, becauſe the parts can dilate: The brain is not a gland whoſe more liberal ſecretion may give relief to its excited circulation: The brain is not an organ deſtined to one particular function, whoſe intenſity of action may increaſe, or intermit; but one deſtined to reign over all the other functions, to regulate the ſenſes, to ſupport the ſenſibility, to guide the actions, to maintain the life of the body, and its connection with the mind: Its ſlighteſt variation is attended with unuſual diſorder, its momentary intermiſſion with inſtant death; and as its circulation becomes intenſe, or ſubſides below the due ſtandard, the main ſpring of the human frame is ſtretched or relaxed: ſurely we may be thus allowed to uſe the language of metaphor, when the plain language of philoſophy fails to expreſs the little we know.

But that which nature has concealed, is leſs truly uſeful; that which ſhe has revealed, is really important. The continual dependence of the brain on its circulation, and the peculiar mechaniſm by which that circulation is conducted, is every way worthy of your notice. This is an inquiry fatal, as juſtly it ſhould be, to many popular theories; for the theory which does not bear an inquiry into the ſtructure of

the part concerned, which is not founded on it, does not acquire from it ſtability, ſtrength, and ornament, is one, in which we ſhould have no faith. Whether we deſcribe the parts ſimply, and ſay it is thus that the arteries of the brain inoſculate; thus are its veins conſtituted: or affirm from experience, that ſuch arteries, and ſuch veins, act more violently, are gorged more eaſily, pour out their contents into the cellular ſubſtance more frequently, or burſt from ſlighter cauſes than thoſe of other organs, ſtill our inquiry is about facts.

OF THE ARTERIES OF THE BRAIN, AND OF ARTERIAL ACTION.

The arteries of the brain are eſtimated, by the moſt ſkilful diſſectors, to convey into this organ a great proportion of the whole maſs of circulating blood: That proportion is eſtimated, even when under-rated, at a ſixth of the whole. The two carotid arteries of great ſize, and the two vertebrals little inferior to them in diameter, go to ſupply the brain; and their diameters being compared with theſe of like giving off, deſtined for other parts of the body, are eſtimated by ſome * as conveying to this organ one third, and by all, as carrying a very great proportion of the blood. "Arteriæ capitis tertiam partem ſanguinis in corpore humano circulantis accipiunt †." Theſe four great arteries inoſculate with each other, ſo as not only to enſure, but to enforce the circulation; not only can the blood, interrupted in one direction, run on to all parts of the organ by other channels; not only is the preſſure, when intermitted in one point, ſupported from every other, ſo that there can be no receding of the blood; but as the preſſure of an injected fluid is uniform and equal in all directions, the force of all the four arterial trunks is concentrated upon every ſingle point, and preſſes the blood onwards to the extremities of the arteries. This maſs of circulating blood is poured through an organ, which, by being incloſed in a firm caſe of bone, cannot yield; and thence every unuſual impulſe of blood is directed onwards to the extremities of the veſſels by a force, from which there is no eſcape: and provident nature has divided theſe arteries into exquiſitely ſmall branches upon the pia mater, that by entering only in the moſt ſlender ra-

* Malphighi.

† Walther de Apoplex. § 49.

mifications, their occafional excited ftate might lefs endanger the very delicate fubftance of the brain.

The arterial fyftem belonging to this exquifite organ, is peculiarly irritable; like the arteries of the Cheek, the Penis, the Eye, thofe of the brain are in an inftant, and as it were electrically excited, even by a thought flafhing acrofs the mind; and this irritable part of the circulating fyftem is driven on at once to violent action, by every mental, and by every bodily ftimulus. Paffions and emotions of the mind are the peculiar ftimuli of this organ: upon the flighteft of thefe, the cheeks flufh, the eyes fparkle, the temples beat violently, the face is bloated, and the head feems filled with blood: the firft fenfations are confufed, and we feel diftinctly the pulfes of the brain: by oppofition, by increafing emotion and contention, by bodily action, or paffionate altercation, excitement rifes to fury. The affuming even the outward action and afpect of paffion, operates as a phyfical caufe; and our immortal poet repreefents Henry as animating thus the courage of his foldiers:

> "Then, imitate the action of the tyger;
> Stiffen the finews, fummon up the blood;
> Difguife fair nature with hard-favoured rage:
> Then, lend the eye a terrible afpect;
> Let it pry through the portage of the head;
> Now fet the teeth, and ftretch the noftril wide;
> Hold faft the breath, and bend up every fpirit
> To his full height."

The grinding of the teeth, foaming of the mouth, the rednefs of the eye, the inflation of the whole vifage; the ftraining of the limbs, the fuppreffion of the breath, the diftortion of the features, fhow that paffion is a fhorter madnefs, accompanied as it ever muft be, (according to the mechanifm of this organ), with an excited circulation of the brain.

The circulation of the brain feems to be fufceptible of peculiar ftimuli, befides the paffions. The excitements of opium and of wine, feem in a particular manner to quicken its circulation. Thefe do not, like fpices, warm the ftomach only; like cathartics, irritate the alimentary canal; like diuretics, excite the kidney; like diaphoretics, ftimulate the fkin; like mercury, prompt the falivary glands to an increafed

ſecretion ;—they affect the brain chiefly, or if they excite the body, it is through the brain : There is a circumſtance which gives a complexion or colour to this excitement, correſponding with certain peculiarities of the exciting cauſe, the direct *excitement* to the brain is accompanied with *ſenſations* by which it is modified. The pulſes of the brain, and its general function, are excited, and its ſuſceptibility increaſed, by the ſtimulus of wine ; while that excitement is mingled with thoſe ſenſations with which the ſenſible nerves of the ſtomach are impreſſed, grateful, or unpleaſant, according to the beverage ; hence the paſſions which ſuch ſtimuli inſpire, are modified by concomitant impreſſions ; and as light, or noiſe, or heat, or hunger, or fulneſs, modify our dreams, when we are excited to dream ; ſo is drunkenneſs modified by the various impreſſions conveyed to the ſtomach by Wine, by Opium, by Ale, by Bang, by Cava, by Arac, or other intoxicating draughts. Not only is the brain itſelf very ſuddenly excited by every increaſed impetus of blood into the head, but the organs of ſenſe ſeated there are alſo affected ; the delicate organs of ſight and hearing partake of the excitement, ſo that while we feel painfully every pulſe of the arteries of the head, the ſenſes of viſion and hearing are ſo diſordered, as to increaſe the confuſion, and warn us of our danger.

The arteries of the brain have, beſides this peculiar irritability, been alledged by anatomiſts to have another ſtriking peculiarity : they cannot, after entering into the brain, have the ſame looſe and flocculent coat of cellular ſubſtance, that accompanies thoſe arteries which paſs along the bending of the limbs : the carotids and vertebrals ſeem thinner and more limber in the coats, than the other arteries ; and thence they have been ſaid by anatomiſts to lay aſide, before entering the brain, their external coat, and become as delicate as veins *. This, I believe, is not ſo much a matter of obſervation, as of inference ; and I mention this general opinion, only as a proof, that either from the delicacy of theſe arteries, from the ſoftneſs of the organ, or from the violent impulſe of blood with which they are often aſſailed, they are peculiarly apt to burſt, and pour out their blood.

Thus is the circulation of the brain quickened by wine, opium, paſſions, emotions, and exerciſe ; and its function ſupported in a ſalutary degree, or excited to

* " Arteriæ tum quod maximum, hæ arteriæ, poſtquam ſubierunt cranium, depoſita exteriori tendinea, potiſſimo motus ſyſtallici inſtrumento, tunica, tenuiores longe ſunt, quam in reliquo corpore, et quaſi venas referunt." —*Hoffman.*

excefs, according to the ftate of the circulation. But every arterial action tends to venous congeftion, and that which firft excited, foon begins to oppref the function. Whether excited by the fury of paffion, or the intoxication of wine, or the poifon of opium, the perfon frequently, at the crifis of this increafed action, falls down oppreffed, apoplectic from paffion, or dead-drunk from intoxication; and if he dies, you find a congeftion of blood in all the venous veffels of the brain. This veinous or fecond ftage of vafcular congeftion, belongs to a part of the vafcular fyftem of the head, not yet explained, to the veins.

OF THE VEINS AND SINUSES OF THE BRAIN, AND OF VENOUS CONGESTION.

The blood returned from the general furfaces of the brain, from the furfaces of the two hemifpheres, and from the furface of the cerebellum, is conveyed by veins which gather upon the pia mater, and run along it in branches gradually enlarging as they approach the finufes. When firft the fcull-cap is taken off, and the dura mater raifed, the veins are feen variouffly diftended, according to the age of the patient, and the manner of his death. They arife by many fmaller branches, coming from within the fubftance of the brain, gather into trunks, eight or ten in number, on each fide, and from the lower parts of the brain; they rife over the fides of the hemifphere, grow larger as they advance towards the finus; they are fomewhat tortuous, are manifeftly very delicate in their coats, and enter into the finus, or great longitudinal canal, not at right angles, but by turning forwards, and opening into its cavity, in a direction oppofite in fome degree to the courfe of the blood. From the furfaces of the ventricles, veins equally confpicuous, are feen gathering into larger branches, even within the fubftance of the brain: In the floor of each ventricle, fuch a vein may be feen livid through the pellucid fubftance of the brain, courfing backwards to join the other veins of the furface, which being united into one congeries of tortuous veffels, form what is named the Plexus Choroides. The veins of the plexus choroides open into the vena magna Galeni; and the vena magna Galeni runs directly backwards into that great central cavity, where the longitudinal finus forks into the two lateral finufes.

The Sinufes of the brain are a very peculiar and provident ftructure, indifpen-

ſably required for defending the veins from dilatation, and for operating as ſyphons for exhauſting the veins: the ſinuſes do not merely receive, but extract the blood of the veins. By deſcribing the longitudinal, the lateral, the tranſverſe, and other leſſer ſinuſes, I ſhould only repeat what you know, and rather divert your attention from that general view of the circulation, with which I wiſh to impreſs you, and from the very ſingular effects of this proviſion of nature. Conceive only, that the dura mater adheres more firmly to the ſcull, along the lines of the ſagittal and lambdoidal ſutures, along the corners of the temporal and the wings of the ſphenoidal bone, and to all the irregular prominences of the baſis of the ſcull: conceive nature to have laid all along the ſagittal and lambdoidal ſutures, large veſſels betwixt the ſcull and dura mater, at the place of this ſtrong adheſion; and to have made all the baſis of the ſcull cellular, by interpoſing leſſer reſervoirs for blood, betwixt the outer ſurface of the dura mater, and every irregular point of bone. Imagine each of the cellular ſinuſes in the baſis of the ſcull, and the long ſinuſes under the ſagittal and lambdoidal ſutures, to communicate freely with each other, to receive veins from all parts of the brain and cerebellum, and to convey their blood into the jugulars; and you have ſome conception of the very peculiar mechaniſm, but not of the very peculiar uſes, of this vaſcular ſyſtem, ſo unlike that of any other part of the body.

The effects, or ſome at leaſt of the effects, of theſe ſingular cavities, cells, and ſinuſes, in regulating the circulation of the brain, may be thus enumerated. *Firſt*, The veins of the brain have no valves, for the motion of their blood is neither hindered nor promoted by interrupted impulſes, like that of other veins, which ſuffer preſſure from the muſcular contractions of the limbs. *Secondly*, Theſe veins, as they are little ſubject to occaſional impulſe of blood; as all the cauſes of dilatation operate upon them very ſlowly as they are occaſionally turged with their own blood, (the blood of direct circulation), but never acted upon by regurgitating blood, by blood flowing backwards from trunks, have thin and delicate coats. Were theſe veins leſs delicate, they could not ſo well correſpond with the delicate ſubſtance of the brain: were they as liable as thoſe of the limbs to dilatation, the ſubſtance of the brain would be diſordered: they are protected from the regurgitating blood, by the interpoſition of the ſinuſes, which ſerve other uſes, which I am next to explain. *Thirdly*, The ſinuſes are not veins; not veſſels having the ſame coats, and the ſame uſes, as veins, and differing merely in being of a triangular ſhape, or of being incloſed in the angles and proceſſes of the dura mater, and betwixt that membrane and the ſcull: They are peculiar cavities interpoſed be-

twixt the branches of the veins iſſuing from the brain, and the great jugular veins, which are their proper trunks: they are not reſervoirs for receiving the blood, for, as they are incapable of dilatation, they can receive no ſurplus: being once filled, they could, as reſervoirs, be no longer of uſe, and blood lodged in ſuch reſervoirs, out of the courſe of circulation, and ſubject to chemical changes, might prove hurtful. The ſinuſes are rigid canals, generally of a triangular ſhape, unalterable in their forms, incapable of dilatation, and equally incapable of contraction; they are as merely cells, as if they were formed, not under the rigid dura mater, but within the firm lamellæ of the bone: reflect on this, and you will foreſee the remarkable uſes of ſuch cells being interpoſed. Firſt, When the blood of the deſcending cava, and of the juguar veins, is by any unuſual act of reſpiration interrupted, that force, that preſſure of regurgitating blood, which would fall upon the branches of the veins within the brain, is reſiſted and broken by theſe rigid canals: in them, as there can be no dilatation, there can be no unuſual fulneſs: when in the ſinuſes the motion of the blood is interrupted, the veins become more turgid; but it is only by being unable to diſcharge their blood, while they are continuing to receive blood from behind, not in conſequence of regurgitation. Secondly, The ſinuſes, being rigid canals, ſuffer no lateral preſſure from the external air, nor from ſurrounding parts; when their blood flows out of them, their coats cannot collapſe; for every drop of blood that runs down into the jugulars, a proportioned demand muſt be made, by the emptying ſinuſes on the leſſer veins within the brain. The ſinuſes, then, are a ſort of ſyphons, by which a perpetual ſuction is maintained from all the venous branches which enter into them; and while other veins are ſubject to dilatation, and have their blood moved by impulſion, from the preſſure of ſurrounding muſcles, the veins of the brain are guarded from dilatation, have their blood impelled only by the force of their arteries, and are emptied by a peculiar mechaniſm.

By every thing curious and delicate in the ſtructure of our body, we are warned of its being formed for but a limited term of exiſtence; and wherever nature is particularly provident, we are reminded of ſome latent danger: by theſe proviſions againſt dilatation of veins belonging to the delicate organization of the brain, danger is plainly intimated; from ſudden or violent dilatation, ſo entirely inconſiſtent with its functions, the brain is thus curiouſly preſerved; but from other cauſes operating ſlowly, affecting this organ at each act of reſpiration, aggravated by every ſlight irregularity, increaſing perpetually as we advance in life, there is no proviſion of nature. It was deſtined that the body ſhould have its periods of growth, perfection, and decline,

and perhaps it is by the derangement of no one organ that the feebleneſs of the body is ſo particularly occaſioned, and ſenſibly perceived, as by that of the common ſenſorium: from the gradual injury of the brain, from dilatation of its veins, and increaſe of its natural exudations, there ariſe a proportioned debility of the general frame, obtuſeneſs of the ſenſes, imperfection of the memory, and weakneſs of all the faculties.

When, from fracture or trepan, the brain is expoſed to view, we perceive it ſenſibly affected by each arterial pulſation, and it is alſo heaved up by each reſpiration. The act of inſpiration interrupts the entrance of the blood into the thorax; the veins of the neck ſwell; the blood of the ſinuſes becomes ſtationary; the leſſer veins cannot deliver their blood, and are alternately turgid, and emptied; and this alternate turgeſcence and flatneſs muſt be felt through all the ſubſtance of the brain. The arteries of the brain operate on their correſponding veins, as other arteries operate on their veins in all parts of the body; each pulſe of the heart has its ſlight effect, and each inordinate reſpiration, as in ſtooping, running, wreſtling, cough, or aſthma; all efforts of ſtrength, all interruptions of reſpiration from diſeaſe, operate upon the head. The veins thus forced by occaſional exertions, and by chronic diſeaſes, gradually change their form; as they dilate, they become more tortuous, and that angle by which they enter the ſinuſes becomes more and more unfavourable towards the decline of life. The veins of the brain cannot be forced and dilated by regurgitating blood, but they are affected by the impulſes of their correſponding arteries, and filled more or leſs tenſely with blood, which is delivered in a proportion correſponding with the actions of the arterial ſyſtem. When the blood of the jugular veins is interrupted, and that of the ſinuſes ſtationary, the veins can no longer deliver their contents; every moment they are prevented from delivering their blood, their angle is increaſing; every time they are thus dilated by paſſion, emotion, aſthmatic paroxyſms, running, wreſtling, diving, the angle ſtill increaſes. The deliverance of theſe veins having become once habitually difficult, the head habitually full, and oppreſſed with blood, and the apoplectic prediſpoſition formed; if with theſe cauſes, (or without them, for it is more powerful than them all), the perſon lives a diſſolute life, "every immoderate cup is unbleſſed," every fit of intoxication is a ſtrain upon this ſyſtem of veſſels; each exceſs in wine gives that excitement, to which the veſſels of the brain are peculiarly ſubject; each paroxyſm of arterial action is accompanied with its degree of venous dilation: Hence the watery exudations of the cavities and ſurfaces of the brain is augmented, the diameter of its veins enlarged, the

cavities of the ventricles dilated, while the mafs of circulating blood is ftill accumulating at the expence of the proper fubftance of the brain. If drunkennefs thus affects the circulation, and the intimate ftructure of the brain, it cannot be a matter of furprife, that in the drunkard all the faculties are affected, the memory ruined, the fenfibility of the general fyftem impaired, the limbs fhrunk, the body cold, the hands palfied, the ftomach debilitated, the circulation torpid, the fecretions diminifhed, and the infatuated creature but half alive, except in the very acme of frefh excitement. Should we wonder, if, where the angle formed by each dilated vein locks it, and acts as a valve, preventing the blood being freely delivered, while increafed arterial action pufhes on the blood from behind, the ftate of congeftion fhould, upon the occafion of any great excefs, rife fuddenly to a ftate of complete apoplexy? Should we wonder, if a perfon thus predifpofed, the circulation of whofe brain is thus deranged, drop down in the moment of riotous indulgence, in the midft of a feaft, infenfible and apoplectic, from the whole being oppreffed, or paralytic, becaufe fome veffel has given way? Should we feek, by myftical terms of exhaufted excitability, of debility direct or indirect, to explain that enervated ftate of the body, which is fo plainly caufed by a ruined ftate of that organ, which reigns over the fenfes, the fenfibility, the mufcular power, and, indeed, over all the functions.

Our fyftem is a machine, fuch as an Almighty Creator would form, animated by an immortal fpirit, but living, acting, and feeling by phyfical laws: and we cannot contemplate this mechanifm, this circulating fyftem, by which the fubtile powers of the mind are influenced, without thofe fears and forebodings, which feem to have occupied the meditations of thofe who have the moft entirely refigned themfelves to this department of ftudy. It is not poffible to be involved in fuch practice, and fuch ftudies: to read through all the authors who have written on thofe melancholy fubjects of Apoplexy, Epilepfy, Palfy: to think of lofing our memory, judgement, and feeling, and yet to remain alive, without horror. "Per multos annos, (fays Walther), hanc rem in animo volutavi, nefcioque an hoc fit objectum mere mihi amicum, vel præfagium, apoplexia me etiam aliquando moriturum; ultimam attamen fere credo."

There occurs here a collateral fubject, which, if I were not to mention, I fhould at once do you and myfelf an injuftice, leaving you in doubt concerning my opinion on a great and prevailing doctrine, or rather in regard to the relation of that doctrine to our prefent fubject. Nothing can be imagined more falfe or unphilofophical, than the common belief, that there are fuch modifications of nervous ener-

gies, as conſtitute diſeaſes independent of phyſical cauſes, or diſtinct from any affection of the brain; nothing more diſcouraging, ſince it puts an end to all inquiry. The doctrine which has for many years prevailed over all former theories, is a ſplendid effuſion of genius, but by no means conſiſtent with facts, not true, not uſeful, nay, it is very hurtful. Debility is not the cauſe of the ſlighteſt nervous diſeaſe; debility, wherever it exiſts, muſt be a temporary ſtate, owing, if the doctrine I alluded to be true, to a ſuſpenſion of the uſual powers of life. Debility, or ſuſpended action, from ſuſpenſion of the exciting powers, is, according to that moſt ingenious theory, but too eaſily removed; for excitability being accumulated, the ſyſtem is too ſuſceptible to the renewed application of exciting powers: Debility produced by want of food, want of light, want of exerciſe, want of air, want of inſpiring paſſions, as hope and joy, the privation of all the ſupporting ſtimuli of life, may blanch the cheek, and emaciate the body, depreſs the ſpirits, and give a heavy and dolorous diſpoſition of mind, but ſtill does not conſtitute diſeaſe. This is miſery and grief, it is merely debility, for it can be removed, but not diſeaſe, which takes place only when ſuch cauſes have, by ſome organic change, affected ſome material part of the ſyſtem. Debility, then, is properly ſuch feebleneſs as proceeds from want of excitement; diſeaſe, ſuch want of action as proceeds from loſs of ſuſceptibility; and loſs of ſuſceptibility flows ſlowly from ſome change of organization. Trace back all nervous diſeaſes to their ſource, and you will find they have a reference to the ſtate of the brain; Apoplexy, Idiotiſm, Palſy, Epilepſy, are not diſeaſes of debility, though inſcribed ſo in the Brunonian ſcale; our ſenſes are all deceived, if theſe be not diſeaſes of altered organization, proceeding from cauſes much the reverſe of weakneſs. That all the functions are debilitated when the intellect is weakened, the ſtomach diſordered, half the body palſied, or the patient trailing his lower extremities, like a wounded ſnake upon the ground, is true; but that debility, from want of ſtimuli, or exhauſted excitability, that weakneſs, direct or indirect, is ever the cauſe of ſuch diſeaſe, is ſo far from true, that diſeaſe does not exiſt, till there is a fatal and irrecoverable change in the ſtructure of the brain; and often, I fear, that excited ſtate, which is deſtroying the organ, and which is ſuppoſed to end in indirect debility, but which truly ends in injury to the ſtructure of the part, is urged on to its fatal termination, by exciting powers, by emetics, opiates, hartſhorn, bliſters, and wine. It is not eaſy to know, when that arterial action has ceaſed, which endangers the organ; it comes, as I ſhall preſently prove to you, in repeated intermitting paroxyſms; and I ſhall teach you, by the plaineſt

practical inferences, to be careful not to impel that blood into the head, which ſo often oppreſſes the brain by the fulneſs of the veſſels, or ruins its ſtructure by forcing them till they give way.

The ſubtilty and ingenuity of that doctrine, which ſuppoſes an excitability univerſally diffuſed inherent in the whole, diſtinct from the office of the brain, independent on vaſcular action, and which may be depreſſed or raiſed, according to the gradations of the exciting power, is indeed admirable: but, it might have been the invention of a metaphyſician, as well as the ſpeculation of one really acquainted with the ſtructure and living powers of the animal body *: It has introduced dangerous innovations into practice, and taught young and inexperienced men to regard, as diſeaſes of exhauſted excitability, thoſe very affections, which plainly and manifeſtly depend on a change in the organ, a ſudden and viſible change. What is gangrene? a Brunonian muſt reply, It is exhauſted excitability: the common ſtimuli, he affirms, have been ſo injudiciouſly uſed, that a high excitement and exceſſive action have taken place, which continues unremittingly, till the excitability of the part being exhauſted, its veſſels are no longer able to act, and thence it dies: or, the uſual ſtimuli have been ſo entirely withdrawn, heat, for example, has been ſo long abſtracted, that the excitability has accumulated till even the uſual degree of heat will have unuſual effects on the ſenſibility of the parts; and in this ſtate of accumulated excitability, the patient being imprudently allowed to approach the fire, or received into a heated room, the accumulated excitability is kindled at once into extreme action, is ſoon exhauſted, and being exhauſted, the veſſels ceaſe to act, the part dies.

To a ſpeculative phyſician, a theory ſo ſimple, ſo philoſophical, correſponding too, in ſome great points, with other laws of the animal body, muſt be pleaſing; but to the practical ſurgeon, it muſt be little ſatisfactory, oppoſite as it is to all theſe obſervations which he has daily occaſion to make: He knows, that when the action of the veſſels ceaſes, and a part of the body dies, ſuch veſſels are firſt ſuffocated, and finally oppreſſed by effuſion of blood or ſerum into the cellular ſubſtance A part, in

* With what ill ſucceſs a phyſician abandons his profeſſional inquiries, neglects the ſtudy of the ſtructure of the animal body, and ſeeks, "by metaphyſic aid," to account for all its movements, my reader will feel very forcibly, upon reading an admirable and eloquent refutation of the Darwinian theories, by Dr Brown of this city.

paſſing through the various ſtages of vaſcular action, undergoes various changes, which are almoſt enumerated in the definition of inflammation, viz. pain, tumor, and redneſs of the part, terminating often in ſuppuration, or gangrene: Vaſcular action, ſlightly excited, and regularly ſupported, not violent in degree, not inconſiſtent with the proceſs of nutrition, cauſes the part to grow, and forms a ſolid tumor: Action more violent, increaſing the ſenſibility, and affecting in ſome degree the ſtructure of the part, creates pain, ſwelling, and redneſs: But ſuch ſwelling does conſiſt of blood ſtill contained within its veſſels; it conſiſts of effuſion, chiefly of ſerum ſo injected into the cellular ſubſtance of the part, that it bears the impreſſion of the finger, and is abſorbed when the vaſcular action ceaſes. But when the action of a part is excited to its utmoſt degree, the veins are no longer capable of tranſmitting the blood impelled into them by the high action of the arteries; the cellular ſubſtance is diſtended, not with ſerum, but with blood; the ſwelling becomes peculiarly firm; its ſurface has a livid tinge, from the bloody extravaſation; the ſtructure of the part gives way under ſuch intenſe action; and the whole limb being injected with blood, its veins dilated and reſiſting, its cellular ſubſtance crammed, the ſkin diſtended to its utmoſt pitch, the arteries are at laſt oppreſſed, and ceaſe to act, and thus the part dies. Why is eryſipelas ſo apt to ſlough? Becauſe that deep complexion which characteriſes the diſeaſe, implies this injection of blood into its cellular ſubſtance. Why does a much bruiſed limb fall into gangrene? Becauſe, its veſſels being burſt, every arterial pulſe injects blood into its cellular ſubſtance. Why does a carbuncle fall into gangrene, but becauſe its character of intenſe redneſs, and bloody effuſion, is marked from the firſt moment of its formation? Why, when the ſurgeon makes an early inciſion, in a caſe of very high and dangerous inflammation, with the hopes of ſaving a joint, or of preventing the affection of ſome of the great cavities, does he find always, not pus, but pure blood? Becauſe, inflammation, requiring ſuch a doubtful meaſure, is ſo violent as to break at once the ſtructure of the part, and produce, even in an early ſtage, an effuſion of blood. What means the old and approved practice of ſcarifying the limb that is in danger of gangrene, but cutting the bark to allow the trunk to ſwell? On many occaſions, I have anticipated fatal deſtruction of ſtructure, by early opening of cellular effuſions, which always I have in ſuch caſes found crammed with blood; and often I have found blood thus effuſed, by extreme vaſcular action, into natural cavities, as well as into the leſſer cells. The Honourable Mr W. from a fall in which he bruiſed the head of the tibia, but not the knee-joint, againſt an angular ſtone, by his neglecting the injury, and dancing that evening,

had, before the third day, the moſt alarming ſwelling of the knee, the moſt intenſe fever, the moſt excruciating pain that I had ever witneſſed, attended with ſuch tumor, that not only the knee, but the thigh and leg, were ſwelled to the thickneſs of his body. I found, in various points, the ſenſe of fluctuation ſo diſtinct, that I reſolved to make early inciſions. Dr Monro and my Brother approved of my deſign, and agreed to ſhare the reſponſibility of ſo unuſual a proceeding. We made inciſion after inciſion, all round the knee-joint; evacuated, from each ſoft and ſaculated part of the limb, and eſpecially from the burſæ, great effuſions of pure blood, which coagulated in the cups; each evacuation put an end to a paroxyſm of fever; each cavity ſuppurated ſlowly; and by ſucceſſive inciſions, careful evacuations of the matter, and the uſe of tents, the limb was preſerved, the joint anchyloſed, and a young gentleman of uncommon talents, and of literary attainments far beyond his years, was providentially ſaved.

What, then, are the diſeaſes of the brain? what are the analogies betwixt its inflammation, and that of muſcular parts? Its diſeaſes are not thoſe of exhauſted excitability! of ſtimuli applied till they loſe their effect! but of diſordered circulation, and injured organization. Not a fit of intoxication, nor paroxyſm of paſſion, but has its effect on the intimate ſtructure of the brain; moſt naturally might we ſuppoſe that an organ ſo delicate could not ſuſtain ſuch violence of circulation, that its function muſt be aboliſhed, and the whole ſyſtem fatally affected, before any excitement could produce in its parts a ſenſible change; but, the univerſal influence of the brain on the animal ſyſtem only makes its ſlighteſt affections conſpicuous; and its delicacy, and the curious forms of its cavities and prominencies, makes the ſlighteſt change of ſtructure viſible. By the violence of excited circulation, the veins of the brain become tortuous and dilated; the bloody points, denoting the calibre of its veins and arteries, become conſpicuous in every ſection of its medullary ſubſtance; they are both more frequent in every diſeaſed ſtate of the brain, and they are augmented in ſize. The cavities are dilated; the watery exudations increaſed; the plexus choroides diſtended with blood; the parts, as the horns of the ventricles, the pedes hyppocampi, and other forms on the internal ſurface of the brain, are neceſſarily enlarged: upon firſt raiſing the ſcull-cap, the brain ſeems to burſt from its confinement, ſo generally turgid is it with blood; and often ſpots of ecchymoſis, or univerſal ſuffuſions of blood, ſometimes on its ſurface only, ſometimes throughout its ſubſtance, ſhew the violence it has ſuffered, from a too rapid circulation. Theſe are a-

mong the phenomena of every diſſection, and the confuſed enumeration of theſe various diſorders has thrown an air of uncertainty over every pathological concluſion, and made the volumes of Bonetus and Morgagni ſeem a chaos of inexplicable and diſcordant facts. But I believe I ſhall be able, by one ſlight narrative and general diſſection, to explain to you the importance, the certainty of ſuch ſtudies, and the harmony betwixt what we ſee our patient ſuffer, and the changes which diſſection diſplays.

A much valued friend of mine, after long continued ill health, died a moſt afflicting death. He died of the diſorder of the head, which is ſo often and ſo fatally aſcribed to the ſtomach. The ſtomach never affects the head: By what mechaniſm, or by what nervous ſympathy, could the ſtomach materially affect the head? It is generally a diſorder of the brain itſelf that affects the ſtomach with ſickneſs, the ſenſes with confuſion, the limbs with debility, the heart with palpitation, the whole frame with tremors: the indeſcribable and complicated ſenſations which we cruelly call nervous, as if they proceeded from a diſordered and ill-regulated imagination, are real and phyſical affections of the moſt important organ of the body. When at any time the ſtomach performs its functions imperfectly, and acidities are generated, digeſtion is imperfect, and the whole body is debilitated, but no hypochondriaciſm belongs to this form of ſtomach-diſorder; it does not affect the head. When the ſtomach itſelf falls into organic diſeaſe; when every morſel is rejected with violent retching, and even the blandeſt fluids excite ſickneſs and pain; when the body is emaciated, and the ſcene of ſuffeing laſts for months; the patient never vomits but when he attempts to take food, and dies merely of inanition; he feels only a ſickly languor and ſwooning, and dies without pain, preſerves his intellect to the laſt hour, and is free from every other diſorder, and every other pain, to the moment of his death. But the ſlighteſt blow on the head, the ſlighteſt variety of motion in ſailing, or in a carriage, the ſlighteſt concuſſion, the ſlighteſt effuſion of blood, the ſlighteſt inflammation of the brain, whatever oppreſſes its ſubſtance, or perturbs the circulation much or little, produces ſickneſs; and that ſick headach, to which my friend's malady was nearly allied, is cauſed always by a temporary congeſtion oppreſſing the brain.

In my friend, the ſtate of ſuffering was long and diſmal; the firſt ſymptoms were headach, complaints of the ſtomach, and frequent delirium; the height of his diſorder was delirium, with inceſſant ſickneſs; in the concluſion his ſenſes returned; he called for help, and knew his friends only after the bladder and viſcera

had become paralytic, a prefage of approaching death. He was for fome years fubject to this very peculiar train of fymptoms, and each paroxyfm followed nearly the fame courfe; firft his general complaints had all the characteriftics of hypochondriacifm, as dull and oppreffive headachs, ftomach-complaints, and variable fpirits, fometimes lively, generally gloomy: After a period in which he felt a fenfe of oppreffion within the head, as if from congeftion, there came on all the figns of high action, a fmart fever, and fudden delirium, followed by a flow recovery, and great weaknefs. His confufion of head and delirium were often flight, and were fo frequent, as to have become familiar to his friends; nor did they leave even a ftrong impreffion on his own mind, but were often a fubject of pleafantry. His paroxyfms began with pain and confufion; then fucceeded inceffant vomiting, like that of a perfon who has a concuffion of the brain, with a torpor of the bowels, which feemed to continue long after each paroxyfm, in fome degree paralyfed; then followed flight raving, and mild delirium; and his recovery was flower and lefs perfect at each return. After a fummer-feafon paffed in making tours, and at watering-places, he returned in good fpirits, and began, in tolerable health, that winter which was to be his laft. Eructations, indigeftions, headachs, and gloomy thoughts, preceded as ufual the fatal paroxyfm. His ftomach unfortunately, and not his head, was attended to by thofe ignorant people to whom he intrufted (what is regarded but too often as trivial) the general regulation of his health. Stimulants and tonics of every kind were adminiftered; at laft the fit of delirium attacked him, while fitting by the fire in a quiet domeftic circle; he raved foolifhly and fillily; he was put to bed; the fury of the delirium increafed, and he ftruggled in this condition for nearly three weeks: the pains in his head feemed to diftract him; the vomiting was inceffant; at laft the venous congeftion, and ferous effufion, having taken place of the increafed action, he fell low, regained his intellect, and recognifed his friends; for eight days, the fhrieking from pain, and the ftruggling from infanity, had ceafed; the functions ran low, the pulfe became feeble, the extremities cold, and the bladder and bowels paralytic, fo that we were obliged to draw off the urine three times a-day. After lying a fortnight in this condition, he expired.

Upon diffecting the abdomen, we found the bowels and bladder flightly inflamed, the latter, efpecially, thickened and dilated from frequent diftenfion. Upon opening the brain, we found at once every mark of diforder; fuch turgefcence of the veins, as fufficiently explained the hypochondriacal and ftomach complaints, fuch

innumerable bloody points in the ſubſtance of the brain, as evinced the highly-excited circulation which cauſed the delirious ſtate; and ſuch watery effuſion as explained the fatal palſy.

In diſſecting ſuch a brain, you will proceed thus: You firſt, after raiſing the ſcull-cap, liſt the dura mater, and you ſee the whole ſyſtem of the veins running in the doublings of the pia mater, black, turgid, and tortuous, paſſing over the hemiſpheres of the brain, towards the longitudinal ſinus: You then draw out the falx, and cut into the ſubſtance, by dividing tranſverſely one of the hemiſpheres of the brain, and then you are ſtruck with finding, in place of ſmall red points, as if pricked with a pin, the veſſels within the ſubſtance of the brain ſo dilated, that their mouths almoſt appear marked with gouts of dark-coloured blood: theſe are the ſections of veins; you are ſenſible, that however active or full the arteries are before, blood after death is to be found only in the correſponding veins. You then cut a ſecond or a third layer of the brain with your knife, carrying it horizontally; and although you had no reaſon to believe you had approached the ventricle, you find that you have cut it open, becauſe it is enlarged, and part of the water flows out by which it was diſtended. You next open the cavity more widely, and find that all its parts are enlarged; that its roof is raiſed, its horns prolonged, the turnings of the Pedes Hyppocampi, and the leſſer hyppocampus enlarged, and apparently magnified; part of the ſerum ſtill occupies the cavity of the ventricle, and its walls are often ſheathed with a mucus, reſembling an inflammatory cruſt. When the ventricles are fully opened up, the choroid plexus are found remarkably enlarged, their veſſels tortuous, and turgid, and their colour darker; and the veins, where they are ſeen ſhining through the ſubſtance of the brain, on the floor of the ventricle, appear unuſually large. All the veſſels of the Velum, too, and of the Pia Mater, every where are turgid with blood. When ſuch are the phenomena, can there be the ſlighteſt reaſon to doubt, that ſucceſſive paroxyſms of vaſcular action and congeſtion of blood, have injured the ſtructure of the brain? that at each ſucceſſive impetus its veſſels have been dilated, its exudation increaſed, its cavities diſtended, its actual ſubſtance diminiſhed? and that to theſe diſorders of the organ are to be aſcribed what are called nervous affections, the depreſſion, languor, and debility, the irregularity of ſpirits, the diſorder of the ſtomach, the emaciation of the body?

I am now to cloſe this general ſketch of the pathology of the brain; and am perſuaded, that when you have conſidered, along with me, individual cauſes, and particular affections, you will return to this plain concluſion, That every leſſer af-

fection of the nervous ſyſtem, is a degree of the greateſt; that no nervous diſorder is without, not only a phyſical cauſe, (for that, though material, might eſcape our ſenſes, and be inſenſible to ſight, or touch), but viſible and tangible cauſes, which we can demonſtrate. That it is a degree of the ſame diſorder, which in palſy makes half the body powerleſs, that cauſes in hypochondriaſis all the ſyſtem to become feeble and languid, the head confuſed, the feelings capricious, and variable, and the functions of the ſtomach and viſcera to fail. Concerning the brain we know nothing ſo intereſting as this unqueſtionable fact, that the injury of its parts does not ruin individual functions; that preſſure from without, and which muſt be local, has ſlight effects, compared with that preſſure which muſt be univerſal, viz. compreſſion from within, by the overdiſtenſion of its own arteries and veins: That of all the organs of the body, the brain is that which moſt depends on the ſtate of its circulation: That under an excited circulation, while ſtill the veins can tranſmit freely the blood of the arteries, the paſſions of the mind are enlivened, the appetites inordinate, the ſtrength and muſcular efforts preternatural: That ſuch excited circulation cannot long endure without terminating in venous congeſtion, or ſerous effuſion; and thence it is that Idiotiſm ſucceeds Mania, Coma ſucceeds Delirium, Palſy follows Apoplexy, becauſe in each, by the continued excitement, or fulneſs, ruin enſues to the delicate organization of the brain; and thence theſe ſtates are incurable, which mere debility, whether direct or indirect, could not be.

We ſhall, in the courſe of our inquiries, be ſenſible how much the ſtate of this organ, and the prediſpoſition to diſeaſe, varies during the progreſs of life; for the child is liable to febrile action in the veſſels of the brain, and watery effuſions, by which the organ, and all its functions, are ruined; this is the horrible diſeaſe of hydrocephalus: The young man, living in a ſtate of high excitement, is ſubject to epilepſy, and to madneſs, both ſtates of the moſt violent vaſcular action and congeſtion: The man at the meridian of life, of forty years of age, whoſe frame is vaſcular, whoſe ſyſtem is full, whoſe paſſions are high, whoſe arterial ſyſtem acts intenſely, but whoſe venous ſyſtem within the head begins to be dilated, is ſubject to acute apoplexy, to ſudden burſting of the veſſels, followed by palſy, and to ſlow congeſtion, with increaſing diſorder of the ſtomach and nervous ſyſtem, and thoſe diſturbed ſenſations which are cruelly pronounced imaginary, though ariſing from a phyſical cauſe. The man paſſing ſixty or ſeventy years of age, has the veins dilated, a ſlow congeſtion is gradually aboliſhing his faculties, and leſſening his ſtrength;

his ſight and hearing are imperfect, his body is emaciated, his memory fails; he feels all the infirmities of old age, and is prediſpoſed to that diſeaſe, the apoplexy, which cloſes the ſcene, (if Walther is not deceived), on one fourth of the human race. Our irregular gratifications, and indulged paſſions; the ſeverities of ſtudy and ſecluſion, of thoſe who are involved in profeſſional occupations, or the variety of climate to which they are expoſed, who engage in mercantile or military purſuits; violent exerciſes, or exceſſive labours in men! and in women, the irregularities of menſtruation, (the difficulties created by this peculiar function, being ſuperadded to their circulating ſyſtem), all ſeem to me to operate on the brain, and to make this train of diſeaſes frequent.

I ſhall not limit whatever information I may be able to convey to you concerning the various ſtates of the brain, by forms, or definitions; I mean not, indeed, to define, but rather to enumerate, thoſe intereſting ſubjects of inquiry which muſt next engage our attention. It is my deſign to inquire, *firſt*, Into the Apoplectic State of the brain, where, from venous plethora, ſlowly increaſing for years, from peculiar habits of life, cauſing a gradual dilatation of the veins, from febrile and ſudden impulſe, to the head injecting its veins with blood, and its ſubſtance with bloody or ſerous exudation, the organ is oppreſſed, and its functions ſuſpended. *Secondly*, Into the Paralytic State of the Brain, where, from accumulation of blood, febrile paroxyſms, violent exertions, crowded rooms, heat, gluttony, and all ſuch cauſes as over-diſtend the blood-veſſels; from ſuch violence as makes blood-veſſels in any organ of the body, but more eſpecially in the delicate ſubſtance of the brain, give way, there is an effuſion of blood, general or partial, which, by deſtroying the ſubſtance of the brain, not only ſuſpends, but entirely ruins its functions, ſo that one ſide, or the whole body, is irrecoverably affected with palſy. *Thirdly*, The Epileptic State, a ſtate almoſt peculiar to the young and vigorous; a ſtate in which the blood is by a ſudden impulſe, an impulſe often excited even by ſympathy and fear; an impulſe diſtinctly felt at the approach of a paroxyſm, and generally attended with a ſenſe of danger, ſo as to incline the boy to cling round ſome firm body for ſupport, accompanied too with the very peculiar ſenſation of a beam of light, flaſhing, as it were, from the eye to the brain; an impulſe which I have generally found accompanied with a peculiar pulſe, and a marked tendency to excitement in the circulating ſyſtem of the head; a ſtate of ſudden arterial excitement, ſuch as often takes place in the time of child-bed labour. That it is to an arterial impulſe ſuch diſeaſe is to be aſcribed, no practical ſurgeon will doubt, who has witneſſed the

high pulſe, turgid neck, ſwelled tongue, and bloated countenance, of thoſe boys who fall for the firſt time into an epileptic paroxyſm; nor any theoriſt who recollects one ſimple fact in the economy of this function, viz. that when one half the body is ſtruck with palſy, the other is uſually convulſed; or, in other terms, while the high action of the veſſels has in one hemiſphere of the brain produced either general or partial extravaſation, the other ſide is at that moment labouring under the continued impulſe and imperfect tranſmiſſion of the blood. *Fourth*, Of the Excited State of the Brain; firſt, Delirium, as in the coup de ſoleille, or in the fevers of warm climates, which terminates in ſudden death, in a degree of palſy; in loſs of memory, in long-continued ailments of the digeſtion and depreſſion of ſpirits; ſecondly, Mania, an excited ſtate, conſiſtent with the health of the body, not ſo properly deſtroying, as exciting, beyond their juſt degree, the powers of the mind, attacking in paroxyſms of excitement, and ending in idiotiſm, or confirmed imbecillity, from the ſtructure of the organ being injured; thirdly, Hydrocephalus, an inflammation of the brain almoſt peculiar to boys, in which after delirium, accompanied with ſhrieks and cries, there comes on ſtupor and convulſion, cauſed by a watery effuſion into all the cavities of the organ, diſtortion of the eyes, contortions of the limbs, palſy of the bowels, and death: Finally, Local Inflammation of the brain, ending in abſceſs and death. In what degree I may fulfil your expectations, I know not, but I ſhall employ now a part of your valuable time, in depicting to you, by obſervations, diſſections, and deſultory remarks, theſe ſeveral ſtates of the brain; relating diſtinctly and plainly what changes are found in the brain, after certain diſorders of the body; this is the ſole theory I profeſs.

SKETCH OF THE APOPLECTIC STATE OF THE BRAIN.

Of blood-veſſels are all parts of the body formed; by vaſcular action are its parts nouriſhed; by the interruption or weakneſs of vaſcular action and ſecretion does the body decay; and when the organization of a part of it is at any time deſtroyed, it is by exceſſive action of its veſſels, injecting the cellular parts with blood or ſerum, filling them with new ſecreted matter, or otherwiſe obliterating the very veſſels by which ſuch matter was ſecreted; or, by ſo compreſſing them by ſudden effuſion, as to produce gangrene. The affection of the nerves is the cauſe of the pain which accom-

panies diſeaſe; but the texture of the parts is ruined only by inordinate action of the veſſels, and by the effuſion of their fluids into its cellular texture.

Every thing in the ſtructure of the animal body, whether we reaſon on the phenomena of vaſcular action during life, or examine the coarſer parts of its texture after death, intimates to us that it is formed only for a temporary exiſtence. I have firſt examined the moſt delicate organ of our frame, whoſe ſlighteſt affections produce paralyſis of the whole body, or diſorder the intellectual powers; and have pointed out various delicacies of organization, on which, together with the fatal prediſpoſitions they create, I am now to fix your attention in a more particular manner.

The baſis of all our reaſoning is the peculiar delicacy of the organ. A complicated function, preſiding over all the others, is ſupported by a complicated and delicate ſtructure; and from the variable ſtate of the circulation in this organ, ariſe a vaſt proportion of the diſeaſes of the body, and all the moſt horrible alienations of the mind. The inordinate deſires, the infuriated paſſions, the cries, the laughter, the rapid torrent of words, the blaſphemies, and unmeaning imprecations, the demoniac-like ſtruggles, and irreſiſtible ſtrength of the madman, are the reſult of a degree of excited circulation, ſtill conſiſtent with the action of its veſſels. The deep oppreſſion of the apoplectic ſtate, the ſtupor of lethargy and coma, are the conſequences of that ſurcharge of blood, that extravaſation of ſerum, or that general effuſion into the ſubſtance of the brain, which reſults either from gradual cauſes operating ſlowly, or from ſuch violent and ſudden action of its veſſels, as the veins are unable to reſiſt without dilatation, or the ſmaller veſſels to ſuſtain without burſting. The maimed condition of the paralytic, who lifts one powerleſs hand by the help of the other, or trails his limbs along the ground, proceeds from ſudden effuſions of blood in the ſubſtance, or upon the ſurfaces of the brain. Innumerable children are cut off, and whole families made deſolate, by occaſional inflammations of the membranes terminating in watery effuſions, into the cavities of the brain, which exudation is followed by howlings, ſquinting convulſions, and death: Nor is there the ſlighteſt reaſon to doubt, that the languor, and miſerable feelings of hypochondriaciſm, the loſs of memory, the idiotiſm, the irrecoverable loſs of hearing, feeling, and muſcular power, which follow the fevers of warm climates, proceed from ſlow or ſudden changes in the healthful ſtructure of the brain, from venous congeſtion, from watery effuſions, from enlarged ventricles, and change of the intimate ſtructure of the organ, which ſeems

firſt and principally affected in theſe tropical diſeaſes. Theſe fevers begin with delirium, and, ſtrange as it muſt appear to a mere philoſophizer in medical ſcience, evacuations only can ſave the patient from diſeaſes which are eſteemed diſeaſes of debility.

The brain, firmly incloſed within the unyielding cavity of the ſcull, is deſtined to ſuffer from every ſlight variation in its circulating ſyſtem; hence its ſtate is as variable as the air, ſubject to every ſkiey influence. Its arteries are in great proportion to its bulk, and its circulation rapid, and eaſily excited, even by thought or motion, by opium or wine; its veins, though having every proviſion againſt dilatation, are yet ſubject to diſtention. Nature is indeed ſo curiouſly provident againſt diſorders in its circulating ſyſtem, as to prove, that here lies the greateſt danger to the organ. The balance betwixt its arteries and veins is ſeldom true, being ſubject to ſo many occaſional cauſes of diſorder; and this balance changes ſlowly, but continually, during the progreſs of life, with conſequences more deciſive to the healthineſs of the whole frame, than can reſult from thoſe ſimilar and concomitant changes, produced by time and uſe, in all other parts of the body. The brain is liable, from the delicacy of all its blood-veſſels, to rupture, with effuſion of blood into its cavities, or upon its ſurfaces; from the delicacy of its intimate ſtructure, to a degree of ecchymoſis, or extravaſations within its proper ſubſtance; from the extent of its cavities and ſurfaces, to watery effuſions, even from ſlight and temporary excitement; and from the extreme vaſcularity of its ſuperficial cellular ſubſtance, it is liable to effuſions of a complete ſerum, ſuch as coagulates into gelatinous maſſes. It is ſubject, alſo, like every other part, to alterations in its intimate ſtructure, by ſlow and gradual changes; as in mania, where long-continued, but moderate excitement ſeems to harden the proper ſubſtance of the brain. Fulneſs of veſſels, effuſions of ſerum, and extravaſations of blood, then, ſeem the chief accidents to which the organ is liable; and the ſlighteſt of theſe affects all thoſe parts and organs of the body, to which the brain ſerves in its healthy ſtate as a ſource of ſenſation. Other parts perform only their own appropriate functions, and are remotely connected with the whole, no farther, indeed, than to give pain when they are inflamed; to produce temporary lameneſs when their inflammation impedes the motion of a limb; or to cauſe a ſlight general diſorder when ſome needful ſecretion is prevented. But the brain relates to the whole, regulates the whole, and that exceſs of vaſcular action which cauſes only pain in a joint or increaſed ſecretion, in a gland, or ſuppreſſed diſcharge, when affecting any of the natural paſſages; that

deep inflammation, which, by extravasation of fluids, suffocates the circulation of a limb, and causes the death of the part, produces, when it affects the brain, delirium, convulsion, or madness; and in its latter stages, in its stages of extravasation, and injured structure, apoplexy, palsy, and the death of the whole body.

You will perceive, that it is my design to put the brain and its diseases on the same footing with other parts of the body, and their morbid affections; to ascribe no disorder to occult properties, but to some physical cause; to consider the consequences of vascular action in this organ, ascribing the various forms its diseases assume, to its complicated relation to the general system. Yet, in ascertaining any physical cause, in associating symptoms with organic affections, there is a difficulty which it is my first business to explain. "The physician should not (says Ballonius) be rash in promising to prove by dissection the cause of death in those who perish from diseases within the head; for I know not how it comes to pass, but so it is, that the knowledge and the cure of the diseases of the brain is involved in difficulties *." "*Many die convulsed, and apoplectic, in whom no marks of disorder, no particle of water, of blood, of ichor, is found effused.*" What can this mean? Is there nothing of the structure injured, even where the disease has thus proved fatal? Is the disease seated in the head, and yet unaccompanied with any disorder in the brain? Can such affections subsist by any other than physical causes? Is it possible, that the patient has perished merely from the excitability being exhausted? Every fact, case, dissection, and inference of any kind, will prove, that he dies, because by external violence, by intense vascular action, or by gradual decline of health, and venous dilation, the structure of the organ has been destroyed.

Whence arises this difficulty of which Ballonius complains? From pathologists imagining always some fixed and permanent change, some mechanical cause for every disorder; from their commemorating in morbid dissections, only what is unnatural. Look to Arnold on Madness, to Chrichton on Mental Diseases, to Bonetus, Valsalva, and Morgagni; and you find enumerated as causes of disease, indurations of the dura mater, thickening of the scull, ossifications of the falx, or tentorium; obstructions of the arteries, of the infundibulum, or of the communications betwixt the ventricles; sabalous concretions round the pineal gland; tumors of various descriptions, hydatids, enlarged ventricles, schirrous and

* "Caveant medici prædicere, se deprehensuros aliquid in capite eorum qui morbo cerebri interierunt."—Ballonius. It is Bouctesa who adds, "Nescio qui fiat, ut morborum cerebri, et notitia, et curatio sit difficillima." "Notitia quidem quoniam multi convulsi sunt, apoplexia, epilepsia sublati, in quibus fere nullum vestigium mali aperto cranio, inventum est, nec sanguis, nec aqua, nec ichor."

glandular-like tumors of the plexus, and even worms in the ſinus: In ſhort, all ſorts and ſhapes of what are called diſeaſed phenomena; all the great, and all the trivial, the old and the recent, the harmleſs and the morbid phenomena, are confounded together: The ſlight thickening, the ſlow oſſification, the recent extravaſation, the gradual changes produced in the ſtructure of the brain, all that ever was obſerved or recorded, is tumbled down before the reader in one promiſcuous heap; the author ſaying, there, theſe, or ſome of them, or all of them, are the cauſes of madneſs, while the paſſing ſtate of the circulation and vaſcular action, the real occaſion of the ſymptoms, and the true cauſe, indeed, of theſe very indurations and concretions, is utterly diſregarded.

Far from diſcovering to us the correſpondence of cauſes and ſymptoms, this proceſs of collecting inſulated facts, and giving equal importance to every accidental change, confounds all cauſes and ſymptoms, and makes the moſt diligent man turn away diſſatisfied from the beſt ſources of inſtruction: the ſtudent, raving after theories, could not find, among this promiſcuous heap, the very ſhadow of a cauſe for any ſymptom, nor ſhape out any of his air-caſtles; the ſober man of practice could not diſtinguiſh one profitable fact, nor uſeful concluſion, nor find a motive for perſevering in ſuch a ſtudy.

Far from being the cauſes, theſe, if they have any relation to any general morbid ſtate, are the mere conſequences and concomitants of diſeaſe. Theſe obſtructed arteries, oſſified membranes, and ſabalous concretions around the pineal gland, are not only conſiſtent with health, but more frequent in health, when long life has allowed time for theſe ſlow changes of ſtructure. In violent, or in long-continued diſeaſes, vaſcular action, while it is altering the healthy ſtructure of the brain, while it is dilating the ventricles, increaſing the natural ſerous effuſions, or diſtending the veins, may alſo thicken the membranes, or even the ſcull; but it is in the operation of this vaſcular action upon the proper ſubſtance of the brain, that the diſeaſe conſiſts. As well might we, in an inflamed and mortifying limb, examine the warts and calloſities with which time and accident have ſtudded its ſurface, as record in the diſeaſed brain only theſe oſſified membranes, or ſabalous concretions. What do we obſerve moſt in a diſeaſed limb? its unuſual heat; its increaſed ſenſibility, amounting to actual pain; its inflamed colour, which implies the higheſt ſtate of vaſcular action conſiſtent with free circulation; that increaſing tenſion, and that change of colour from red to purple, which implies bloody extravaſation: We obſerve, in the progreſs of the inflammation, that incipient coldneſs which implies that its blood has

ceafed to circulate; thofe veficles on its furface which imply that its fluids are extravafated, and no longer fubject to the laws of the circulating fyftem; that increafing drynefs and cruft-like hardnefs of the fkin, which marks the laft ftage of fphacelus, when the limb is utterly dead.

In the brain, the phenomena of vafcular action can be no other than in a limb; the peculiarities of ftricture give fome variety of form, the peculiarity of function gives every variety of fymptom. The brain, burfting as it were from the cranium, from fulnefs of blood, the moment the fcull-cap is raifed; the reddened membranes, the turgefcent veins; the effufed ferum, the enlarged cavities; the veficular rifings upon the plexus choroides, the gelatinous effufions betwixt the lamellæ of the pia mater, bear a plain direct analogy with fimilar changes in an inflamed limb. Small aneurifmal cavities in the fubftance, and on the furfaces of the brain, are a frequent confequence of high vafcular action. Whereas pain only is excited in a limb, in a certain ftage of vafcular action, madnefs, delirium, phrenzy, accompany the fame ftage of inflammation of the brain: that fuffocated ftate of the veins and cellular fubftance, which ftops the circulation of a limb, and kills it, oppreffes the function of the brain, and paralyfes the whole body: thefe, then, are pure and natural confequences of the peculiar function, and univerfal influence of the brain over the fyftem. Inflammation of the eye caufes tumor, rednefs, and exquifite fenfibility, fo that all objects appear red, and the light cannot be endured; but when effufion happens, when blood is poured out from violent action into the cavities of the eye, when, from the tranflucidnefs of the organ, you can look down into its centre, and fee (as I had the unhappinefs laft feafon to fee in many inftances of an epidemic ophthalmia) blood effufed into the cellular fubftance of the vitreous humour, the patient is blind, for the organization is irrecoverably deftroyed.

If it feem difficult to imagine how fymptoms and difeafes fo difcordant and fo oppofite as lethargy and phrenzy, madnefs and palfy, can arife from various ftages of vafcular action, from varieties of one caufe, let it be remembered, that any ftage of vafcular action exceeding the healthy ftate of it, caufes various changes on the intimate ftructure, attended with proportioned changes on the function of the part; that thofe changes are manifefted after death; that if this be a difficulty in the plain and level way of obfervation and diffection, it is much more confpicuoufly a blemifh in every general doctrine; for whether it is by remora and obftruction of veffels, by fpafm on the furface, or debility of the whole frame, that the theorift explains difeafes, the various fymptoms and periods of difeafe, of fever for example, are imputed to varied operations of that one caufe, which

ſhews that phyſicians have been always conſcious of various phenomena riſing up in the courſe of one progreſſive action, which action I affirm to be an irregular circulation, followed by a change of ſtructure almoſt always demonſtrable after the fatal concluſion of the diſeaſe. But when we proceed to examine what the changes are, which conſtitute the apoplectic, the paralytic, or the hydrocephalic ſtates of the brain, we feel confidently, that we are no longer forming probable or pleaſing conjectures about ſome indefinite ſtate of the veſſels; we do not ſpeculate, but inveſtigate; we prove, by reaſoning and diſſection, and reſt confidently upon thoſe proofs.

It is not poſſible to be employed in diſſections for ages, without making ſome approximations to truth; and accordingly, pathologiſts, without having gone decidedly back to the great cauſe from which both the ſymptoms of diſeaſe, and the phenomena appearing on diſſection, proceed, viz. increaſed circulation, or venous congeſtion of blood, yet have obſerved very carefully all the conſequences of that increaſed circulation: all that implies the exiſtence of excited vaſcular action, they have proved by innumerable diſſections, but the effects of it on the ſubſtance of the organ itſelf they never ſuſpected, even while they deſcribed the effuſions into its cavities, or on its ſurfaces. To theſe effuſions they imputed the diſeaſe and its ſymptoms; thence came the long eſtabliſhed diſtinctions of Apoplexies, Sanguineous and Serous, Atrabilious, Pituitous, and even Flatulent *. Incorrect obſervations led the older pathologiſts into wretched theories; as they knew nothing of abſorption, either lymphatic or venous, they imagined that ſerum, once effuſed, muſt find a direct paſſage out: they never ſuſpected that the openings from ventricle to ventricle were, in their natural ſtate, cloſed by the adheſion of the plexus and velum: they believed them patent, and that whatever fluid was effuſed into either of the lateral ventricles, paſſed eaſily from them into the third, from the third into the fourth, and from all of them into the infundibulum; and when water was found in the ventricles, they ſuppoſed it to be from this laſt ſluice being obſtructed: "If theſe paſſages (ſays Morgagni) be clo-

* Cardanus ſtoutly denies that there exiſts any ſuch thing as the pituitous or ſerous apoplexy. He aſcribes all to the atrabilis: "Dico nullam apoplexiam fieri ex pituita, proximam huic, omnem apoplexiam ex atrabile fieri;" and he reaſons well: "Præterea, ſi apoplexia e pituita præcipue fieret, et hi maxime ſenes corriperentur apoplexia, qui pituita abundarent in cerebro, atque ita gravedinibus et rancedinibus laborare; ſic et aquæ potores, et non vini, ſomnolenti, et non vigiles; at nihil minus horum." When do we ſee theſe cool-blood patients ſeized with apoplexy? The ſanguineous, the paſſionate, the ſhort-necked, the free-living, luxurious, and indulgent; men paſt the middle periods of life are the chief victims of this diſeaſe, which, with the vulgar, is comparatively rare.

ſed up, a great dropſy of the brain will enſue;" and his 37th article is appropriated to the diſcloſing of this important fact, "That an occluſion of the infundibulum hinders the defluxion of the moiſture from all the ventricles of the brain *." They thought only of theſe irremediable obſtructions, without ever reflecting on that diſ-

* The procreation of one falſe conception upon another is wonderfully rapid, and you may diſtinguiſh a family-likeneſs among all the progeny. Thoſe doctrines about the uſes of the ventricles, and the conſequences of the ſeveral paſſages from one cavity to another being obſtructed, are old, for they were known in the days of Galen. Firſt, The ſeveral faculties were imagined to be diſtinct ſecretions, of which each ventricle elaborated its own proper ſhare. Secondly, That the motion of the ſpirits from ventricle to ventricle muſt create great and manifeſt diſturbance, and confuſion of ideas and faculties. Thirdly, That along with this morbid abſtraction of the courſe of the ſpirits from cavity to cavity, the coarſer parts, the ſuperfluities, as Galen calls them, the parts which ſhould be drained off through the infundibulum, &c. muſt be inſtructed, and all the finer ſpirits entangled in the thick pituita, or drowned in the lymph which was thus collected in the ventricles.

It is chiefly from Galen, in his book De Usu Partium, that the phyſicians of Europe have imbibed their opinions about the uſes of the ventricles: "Anteriores duo ventriculi, inſpirationem et expirationem, efflationemque ex cerebro efficiunt; hæc enim alibi demonſtrabimus. Nec minus quoque demonſtrabimus, quod prius quidem conficiunt, ac præparant ipſi cerebro ſpiritum animalem; atque etiam et quod inferius ſuis partibus, quæ ſpectant ad nares, ſimul quidem olefactorium ſunt inſtrumentum, ſimul autem veluti ductus quidem ac canalis ad ſuperfluorum effluxionem accommodus, paulo ante indicavimus,"—Cap. x. In deſcribing the via crassorum cerebri superfluorum, he proceeds to ſay, "Rurſus igitur ad reliquum genus meatuum cerebrum purgantium, reverſi, naturæ in his artificium explicemus," &c. How he explained them, how his ſucceſſors commented upon his text, how minutely the ſeveral diſtillations of the ſeveral cavities of this wonderful organ were underſtood and deſcribed, as if the brain had been a "limbec only," will be found by the following ſerious deſcription of Guido. "The brain, according to its length, is occupied by three cavities, and each cavity has two parts, and in each part is prepared a quality. In the anterior part of the firſt cavity reſides *common ſenſe*; in the ſecond, the *imaginative faculty*; in the middle ventricle is inſtalled the *cogitative and rational faculties*; and in the laſt and poſterior cavity are depoſited the faculties of *memory and recollection*; and among theſe cavities the anterior is larger, the middle ſmaller, the poſterior of an intermediate ſize; and from one to another are *paſſages for the tranſit of the ſpirits*." No wonder, while all this chemiſtry and cookery was going on, that ſometimes *fuliginous* vapours diſturbed the brain, and obſcured theſe chambers of the faculties, or that in theſe contiguous laboratories the ſubtile and precious qualities were a little confounded and mixed.

"Cerebrum ſecundum longitudinem habet tres ventriculos, et unuſquaque venter habet duas partes, et in qualibet parte organicatur una virtus. In prima parte ventriculi anterioris, aſſignatur ſenſus communis; in ſecunda, imaginativa, in medio ventriculo ſituatur cogitativa et rationalis; in poſteriori vero, ſervativa et memorativa. Et quod inter iſtos ventriculos anterior eſt major, medius minor, poſterior mediocris, et de uno ad alium ſunt meatus per quos tranſeunt ſpiritus."—*Guidon*, tract 1.

Willis, cap. xii. in deſcribing the occaſional relief from headachs experienced by a lady, whoſe recovery from a paroxyſm was uſually preceded by a trickling, as if of water, along the forehead, and the ſubſequent diſcharge of a few drops from the noſe, ſeems willing to refer the whole phenomena to the alternate obſtructing and opening of the natural openings and communications among the ventricles, and through the infundibulum.

ordered ſtate of circulation, which might be ſo eaſily regulated, and which was truly the cauſe of ſuch ſerous colluvies. The apoplexy is juſtly divided (ſays Boerhaave) into ſerous and pituitous; but the diviſion is by no means perfect, ſince there are alſo apoplexies from Atrabiles, from Pituita, from Gelatinous matter, from Polypi, and other cauſes *;" and from all that I can collect, the induſtry of theſe old phyſicians, in obſerving the peculiar matter found effuſed upon the brain, was ſharpened by a perſuaſion expreſſed in all their writings in very direct terms, that the irritations produced by ſuch ſerum, pituita, and atrabilis, were various, and the ſymptoms conſonant to the kind of irritation.

That in modern times the belief even of a *Flatulent Apoplexy* could have prevailed, muſt ſeem to you almoſt incredible. Morgagni had, in reſpect to the collections of water and other effuſions into the cavities of the brain, but one ſolution for all kinds of difficulties, mighty ſimple and ingenious, when once you could be perſuaded of the fact, and very univerſal, too, in its application, viz. "That when a thing cannot get out, it muſt ſtay in." Morgagni, when he ſets himſelf to account for that air, which, upon a vein being tied, and put under an exhauſted receiver, bubbles out, does not conjecture, like Littre and others, how it may have got into the vein, but proves plainly, that whatever way it got in, it cannot get out. "For if (ſays Morgagni), and your *if* is an excellent ſolver of difficulties! thoſe ſmall pores through which the air is to paſs outwards from the blood be by any means conſtringed and ſtopped up, the others continuing pervious, whoſe office it is to admit air into the blood, in as much as they are appendages of the pulmonary veins, and not of the pulmonary artery, you ſee that immediately too great a quantity of air will be collected in the blood." But unfortunately the number of *ifs* in this proceſs of reaſoning is ſuch as excludes every thing elſe. If there be pores which admit air into the blood, and if there be other pores calculated to exhale the ſaid air; and if theſe pores be of ſuch a nature as to be conſtringed; and if the inhaling pores be open while the exhaling excrementitial aerial pores are conſtringed; why, then, it is plain as the ſun at noon-day, that there muſt be a whole tempeſt of aerial particles accumulated in the blood. The paſſage I have inſcribed below from Bartholin †, in vindication of this ſame doctrine, is

* Aphoriſm 1012.

† That through this artery, "in bodies that were ſound, recrementitious matter was diſcharged in expiration, which is nothing elſe but the aerial particles excited in the blood of the heart, and the other parts of the body

well worth its place on the margin. Thus does Morgagni not only intimate, but prove, that besides the pituitous, serous, and atrabilious, there may be a flatulent apoplexy, from wind collected in the veins of the brain, and preventing their circulation; just as Avicenna observes, "That a great pain of the head is brought on by the arteries bringing noxious vapours to the brain." He does not hint it obscurely, as a thing he were afraid or unwilling to affirm, but says *, "This being the state of the question, it appears, that if air should beset many of the smaller vessels of any certain part at one time, the motion of the blood, and any thing depending thereon, must be interrupted. *Suppose*, then, that this part be the brain, and you will instantly understand how an apoplexy might arise therefrom! and you will commend Hollerius, who says expressly, "that apoplexies are brought on even when the carotid arteries are obstructed in the rectiform plexus, by *flatus, or any thing else.*" Unfortunately for this pneumatic apoplexy of Hollerius and Morgagni, there is no such peculiarity of structure in the human body, as that of the rectiform plexus, which is peculiar to brutes.

Were I addressing my discourse to those who had studied pathology in books, who had made up their belief, and could find no cause adequate to the phenomena of disease slighter than a tumor, ossification, or bursting of an artery, I should despair of doing good. But I hope for better success in addressing myself to you, whose minds are yet untainted with prejudice, ready to examine and compare impartially the marks of accelerated circulation with the dismal symptoms which it causes; and I confidently direct you to fix your observation, not on

(or, as he had said before, nothing but the air and superfluous flatus of the crude blood), from whence also the flatus, that was troublesome in the veins, according to Hippocrates and Galen; which, if not evacuated by the *common fan of the body*, not only bring on various painful symptoms, but even, if they stagnate, may cause a rupture of the veins, or raise the whole body into a tumor." And Plato, also, seems not only to have touched upon the whole of this hypothesis, but that likewise which I shall afterwards subjoin; and I am not sorry to quote his own words on the occasion; for he says, "When the lungs, the guard, and as it were the *store-keeper of the breath itself*, being obstructed by defluxion, has not its vents free and open; and, on one hand, no air is discharged; and, on the other, more than is necessary is received; then those parts which want respiration and cooling wither away. But *that which is received over and above, being carried through the veins, tortures them, and melts down the body.*" And a little after, "Air is often generated, even within the body, when the flesh is flabby and rarefied; *which, as it cannot get forth*, gives the same pains as air would *that came in from without.* But it then gives most excruciating pains, when it inflates and distends the nerves and veins that lie round it.

* Art. 18.

offifications, obftructions, and tumors, but on thofe ftates of the circulation which leave often but flight and evanefcent marks. Extravafations of blood, or effufions of ferum, are indeed frequent in apoplexy; often a blood-veffel giving way is the immediate caufe of death; but thefe are merely concomitants or confequences, by no means effential to the apoplectic ftate, which is fimple, and confifts merely in the fulnefs of the vafcular fyftem of the head: After a man having dropped down apoplectic, there is often found, after death, no diforder of organization; it is by inference and general appearances only that the ftate of the brain can be proved.

The pure apoplectic ftate of the brain confifts merely in accumulation of blood in its veffels: What the marks are of that accumulation, by what caufes it is produced, by what fymptoms accompanied, I fhall now proceed to relate. The marks of the apoplectic ftate are fuch as ftrike the recollection of every one who has feen the head opened, and are expreffed by almoft every fpectator in words nearly fimilar. Upon cutting open the dura mater, and turning it upwards, when the furfaces of the hemifpheres of each fide of the brain are difplayed, we obferve the pia mater red, and its vafcularity more apparent: the general rednefs is interfperfed with maculæ, or broad fpecks and fpots of extravafation, flight and diffufed, and of a glutinous appearance within the reddened membrane: the great veins of each hemifphere are feen numerous, their branches fwollen to the fize of trunks, and the trunks unufually diftended, tortuous, and filled with a black and grumous blood, as if long collected and ftagnant. The expreffions by which this appearance is defcribed, are very impreffive. "Venæ quafi variofæ: vafa meningum et cerebri fanguine ad fummum turgida." But while the fuperficial veins are thus vifibly diftorted and dilated, all the vafcular fyftem of the head is fo full of blood, that the brain is univerfally turgid, and the compreffion which it endures before death is evinced by the manner in which it burfts as it were from the fcull in the diffected head. "The fcull feems too ftrait for the brain." "Cranium videbatur vix cerebri capax, præ fumma illa plenitudine et diftenfione vaforum membranarum, quodammodo liventium *." "Cranium nimiam cerebri molem non poterat capere." "Calvaria aperta, vafa meningas obducentia erant fanguine referta, et plurimum diftenta, quafi cruoris maffa tota illic confluxerat." In fhort, the brain feems to burft from its confinement; the veffels appear numerous, tortuous, and diftended; the blood is dark, grumous, and fettled in the veins; upon opening the finus, the black blood rufhes out, and inun-

* Bonnetus.

dates the brain; upon cutting into its ſubſtance, the red points and gouts of blood, indicating the ſections of the internal veins and arteries, are large and frequent: judge, then, how much each individual particle of the brain, incloſed within the unyielding ſcull, and preſſed by ſuch a force of circulation within its ſubſtance, muſt ſuffer. This conſtitutes the ſimple ſtate of apoplexy, and thence it proceeds that many expire, in whoſe brain there appears none of the expected marks of diſorder: "Nulla veſtigia mali, nec ſanguis, nec aqua, nec ichor."

When a perſon falls down apoplectic, it is moſt natural to imagine that ſome blood-veſſel has given way within the head. This concluſion glides imperceptibly into the mind, from our having often read, and uſually found upon diſſection, that when the perſon drops down dead, blood is thus effuſed, without recollecting, that a thing common may yet not be eſſential to the apoplectic ſtate, without remembering how nearly the effects of running, wreſtling, ſtruggling in a mob, or other violent exertions, approaches to a fit of apoplexy; how often, after ſuch exertions, the patient feels almoſt apoplectic, or entirely ſo, and yet recovers; how inconſiſtent ſuch recovery is with the conception of any giving way among the veſſels of the brain. It is related by Bonnetus*, that a woman of forty years of age, prediſpoſed to apoplexy, and ſubject to a heavy and dull pain of the head, but ſuch as ſeemed to threaten no danger, having one evening ſtooped to blow the fire in preparing ſupper, fell down inſenſible, and died in a few hours; yet in this caſe, where we ſhould naturally have expected to find marks of ſudden injury, there was no effuſion of blood, and no more ſerum than might have been collected by habitual diſtenſion of the veins, or effuſed in the hour of diſſolution, or after death. "Next morning, her head was opened; all parts of the brain ſeemed ſound, ſaving that the ſurfaces were ſuffuſed with a reddiſh ſerum, (a deſcription of ſerum which implies a very recent effuſion), and the veins varicoſe and diſtended." Willis relates ſhortly the caſe of a lady of high rank, many years ſubject to ſpaſmodic affections, and who had ſuffered much and long from gravitating pains of the head: On the night on which ſhe died, having ſlept ſoundly during the earlier part of the night, ſhe was awoke by a convulſive affection, which almoſt immediately ended in an apoplectic ſtroke, of which ſhe expired. A narrative like this conveys ſtrongly the impreſſion, that the patient has died from the burſting of a veſſel, and effuſion of blood, (which convulſion and oppreſſion, terminating in ſudden death, almoſt always imply); but in this lady there was found, upon raiſing the dura mater, no ſuch thing, no extravaſation, no

* Page 142.

peculiarity of appearance, but that univerſal diffuſion of ſerum, which perſevering headachs, attended with accumulation in the blood-veſſels, always cauſes. but the whole circulating ſyſtem of the brain, both veins and arteries, were diſtended with blood. It is the ſuppreſſion of reſpiration in violent ſtruggles that injects the blood ſo into the head, inflates the viſage, and forces the internal veins of the brain, as it does the external veins of the forehead and temples, till giddineſs, blindneſs, tinnitus aurium, enſue; and it is when by ſuch accumulation of blood the brain is compreſſed, and the muſcular power univerſally affected, that the patient drops down. It is recorded by Hildanus *, of a boy of fourteen years of age, that, having wagered with a companion that he would ſneeze a hundred times running, he went to work, and, by inceſſant tickling of his noſtrils, had ſneezed out his hundred times and more, when ſuddenly he was ſeized with pain of the head, and dimneſs of ſight, which on the following day was entirely gone; but he had neither fever nor inflammation of the eyes, and in a few days he was reſtored to his ſight by the preſcriptions of Hildanus, Saracenus, and Bonet, chiefly by planting a ſeton in the neck, and cupping-glaſſes on the ſhoulders, to make revulſion †.

" A boy, (ſays Peter Zitzilius), in whipping his top, ſtooping and riſing alternately, with his neckcloth drawn ſo extremely tight, as to check the circulation of the head, fell down ſuddenly in a complete apoplexy; but his neckcloth being inſtantly undone, and blood drawn from the jugulars, he was ſaved, and reſtored to ſenſe and motion, which were entirely gone ‡."

You thus perceive, that the ſimple apoplectic ſtate, the mere diſtenſion of the arteries and veins, makes the patient fall down inſenſible; his recovering thus proves, that the organization has not ſuffered, that no veſſel has given way, that the regular

* Centur. i. obſ. 24.

† " Adoleſcens 14 annos natus, et phlegmatici habitus, cum æquali ſponſionem fecit, poſſe ſe ſternutare ad libitum, imo etiam centies. Depoſito pignore, cœpit ex immodica titillatione irritatis naribus ſternutare, circiter centies et amplius. Exin protinus correptus eſt dolore capitis et hebetatione viſus, qui etiam ſequenti die deperditus fuit, citra tamen inflammationem oculorum aut febrim. Convocatis mecum clariſſimis doctiſſimiſque viris, Jano Antonio Saraceno, et Andrea Boneto, decretum eſt, ut purgato corpore ſetaceum adhiberetur collo, uti et ſcapulis cucurbitulæ; atque his uſus revulſionibus, viſum paucos poſt dies recepit."

‡ " Adoleſcens, dum ſæpius deorſum et ſurſum caput deprimeret et elevaret, collo nimium per collare conſtricto, ſubito concidit vere apoplecticus. Laxato vero collari, et vena ſecta, ad ſe feliciter rediit; reſtitutis ſenſibus et motibus, quos omnino perdiderat."—Act. Acad, Scienc. Succive, ann, 1757.

courſe of the circulation can be eaſily reſtored. This young man, thus falling down, and thus reviving, conſtitutes the intermediate ſtate betwixt complete apoplexy, and that giddineſs, confuſion, and ringing of the ears, which we feel upon any unuſual exertion, and which we ſee in rope-dancers, horſemen, wreſtlers, trumpeters, &c. accompanied with an inflation of the face, and protruſion of the eyes, not without danger. This venous congeſtion is the kind which follows from glaſs-blowing, diving, and all ſuch exertions as ſuſpend reſpiration. This is the condition of thoſe ſuffocated by hanging, drowning, or the fumes of charcoal. It is not by ſuſpended reſpiration, or want of oxygenated blood, they expire, but from the circulation within the head being ſuſpended, and from the accumulated blood compreſſing the brain within the limited cavity of the ſcull. I have remarked thoſe drawn from a choke damp, or found in a chamber full of carbonic gas, breathe long. I have ſeen them breathe for hours, with a ſtertorous noiſe, an oppreſſed and ſlow pulſe, a dilated pupil, the face and neck diſtended and diſcoloured, with venous blood, bathed in a cold ſweat, with tremblings of the limbs, and irrecoverably apoplectic. Of two men ſuffocated in one bed, I have reſtored the one, and loſt the other patient. "I have had innumerable opportunities (ſays Walther) of diſſecting the bodies of the drowned, and I have ever found the ſtomach and the lungs equally free from water, and wateryfroth. The epiglottis, as uſual in other dead bodies, but always the veins of the head, very turgid with blood, as in thoſe who are hanged *." This was the occaſion of the death of the black trumpeter, related by Morgagni. "There was an Ethiopian at Venice, who was thirty years of age, of a maſcular make, and in good health, unleſs that in the laſt months he had been ſubject to a certain languor of his ſtomach, joined with a ſlight ſweating, which, however, immediately went off, on taking food. This man, about the middle of July, in the year 1708, being very chearful with his friends at breakfaſt, for it was in the morning, and ſtanding to play on the trumpet, as he uſed to do; while he was playing, fell backwards ſo gradually and ſlowly, that his companions would

* "De vero modo quo ſubmerſi moriantur, in Gallia magna fuit lis, et quæ me judice non ſatis explicata eſt. Omnis res eo redit. Quæritur, An in pulmonibus et in ventriculo ſubmerſorum unquam aqua ſit inventa, et quomodo epiglottis ſe habeat? Explicatio hujus queſtionis omnino magni momenti et difficilis eſt, maximeque tractatio prudens ſubmerſorum et remedia convenientia pendent.

"Mihi occaſio fuit magnam copiam hominum ſubmerſorum inveſtigandi, nunquam vero aquam in ventriculo, nec aquam ſpumantem in pulmonibus vidi, epiglottiſque eodem modo ſe habuit ut in omnibus reliquis hominibus fieri ſolet; vaſa cerebri ſanguifera, ut in ſuſpenſis, ſanguine turgida inveni."—*Walther*, § 26.

have thought he did it by way of amuſement, if they had not obſerved certain tremors running over his whole body as he fell. He died, however, the very moment that he fell."

In all violent exertions, and ſudden efforts of reſpiration, in that ſtraining which we ſee inflate the head and neck of a porter, or ſailor, when working at the crane, or heaving on the capſtan, the danger ariſes from having the lungs in a continued ſtate of compreſſion, expiration long continued, the blood prevented from entering into the thorax, and accumulated in the head. In cough, aſthma, tumors of the thyroid gland; in choke-damp, drowning, and every caſe, complete or partial, of ſuppreſſed reſpiration, the difficulty is in inflating the lungs, and the blood is by laborious reſpiration at once impelled into the head by an accelerated pulſation of the arteries, and retarded by compreſſion of the veins, as is evinced by the pulſation in the temples, and the turgeſcence of the neck; thence apoplexy, or accumulation of blood, and palſy, or burſting of the veſſels, are dangers inſeparable from this ſtate. In the convulſive paroxyſm of the hooping-cough, while the child clings to ſomething for ſupport, its face and neck ſwell at every ſucceſſive ſtroke of the lungs; its eyes ſtare, and are protruded, its face is purple, its limbs tremble, and it becomes giddy, and often falls down in a fit. Obſerve the condition of a patient, who is in danger of ſuffocation, from ſome accident at table, how the face and neck ſwell, the eyes become prominent and ſuffuſed; how the blood ſometimes guſhes from the noſtrils, how the ſenſes are gone; the head falls upon the ſhoulder; the patient drops down powerleſs, and recovers by ſtillneſs from a ſtate of moſt imminent peril; and when ſuch patient dies, it is of apoplexy, and there is found, upon diſſection, dilated veins, a turgid brain, and every mark of congeſtion of blood. "Nos inter alia novimus (ſays Hoffman *) a mica panis aſperæ arteriæ illapſa, vehementiſſimam concitatam fuiſſe tuſſim, quem excepit hæmorrhagia in cerebro, lethali cum eventu." Even from the very firſt moment of ſuffocation, the apoplectic ſtate, with all its conſequences, the congeſtion in the head, with inſenſibility and ſtupor, is formed, and the whole of the enſuing ſcene is a ſucceſſion of apoplectic inſenſibility, and unavailing ſtruggles, till the patient expires. From the firſt moment, the head ſeems as it were injected with blood, and reminds me of the change produced upon a dead body, by injecting the carotids ſo ſtrongly with ſize, as to fill the veins. Once in preparing to diſſect the brain of a man who had

* § xi. cap. 7.

died of an injury of the head, I injected it with ſize, and, for particular purpoſes, ordered a caſt of the head, little imagining how ill ſuch a head would repreſent the features of death. The features were ſo diſtended with the ſize-injection, the mouth diſtorted, the lips protruded, the forehead and its veins ſwelled, and the eyes projected, as to repreſent a ſtate of apoplectic drunkenneſs, making the caſt uſeleſs for any purpoſe, unleſs it had been for a drawing of Silenus.

There is one fact worth your notice, ſince it proves, in the moſt curious manner, that apoplexy is, in thoſe who are drowned or ſtrangled, the ſole cauſe of death, and the conſtriction of the neck the ſole cauſe of the apoplexy. "Thoſe ſtrangled, (ſays Sauvages), unleſs the neck be actually broken and diſlocated, (which ſkilful executioners know how to accompliſh), are eaſily reſtored to life, as I can affirm from having frequently revived animals after experiments of this nature, and once a man after execution. He was brought from the gallows into a church, when by bleeding him thrice in the courſe of two hours, he was not only brought to life, but felt ſtrong and well, for he ſat upright, carried a water pitcher to his head with his own hand, drank plentifully out of it, and ſaid he was very hearty. But he ſaid, (and it will hardly ſeem ſurpriſing), that he was a little hoarſe or ſo, and his voice weak, nor could he ſpeak even in that feeble tone, without expectorating a little blood, and drinking abundantly out of his pitcher. Though the weather was by no means ſultry, he delighted in a continual draught of cool air, for he was very feveriſh. In about three hours, the mark of the halter, which had almoſt diſappeared, began to redden and ſwell, and foreſeeing a new obſtruction to the return of the venous blood, and a ſubſequent torpor, I directed that he ſhould be bled from the jugular, for the fourth time. But the young ſurgeons had been alarmed, and taken flight, the bleeding was neglected, he fell into a ſtupor, the pulſe became gradually ſlower, ſo that it hardly beat forty in the minute; though it had manifeſtly riſen upon the firſt bleeding, it now grew weak as well as ſlow; and this poor ſoul, whom no crime had brought to the gibbet, was allowed to die, a ſecond time *."

* "Eſt mors apparens eorum, qui recens ſtrangulati, vel ut mos eſt, ſune ſuſpenſi ſunt, ſimilive modo ſuffocati; illi certe, niſi ſimul colli quædam vertebra luxata fuerit, quod periti carnifices norunt, facile ad vitam revocantur, ut expertus ſum aliquoties in brutis, ſemel in homine, qui e patibulo allatus in templum, tribus phlebotomiis intra duas horas inſtitutis, non ſolum vitæ, ſed ſatis commodo ſtatui, reſtitutus eſt; ita ut ipſe ſedens, et aquam ex urceolo, quem manu geſtabat, affatim bibens, bene ſe habere mihi diceret; vox autem rauca, initio-

" Mr C. a young gentleman uncommonly athletic, about ſix and twenty years of age, had been wet in hunting, had ſat in wet cloaths, and ſupped abroad, and continued revelling in the ſtreets, ſtill wet, and expoſed to eaſt fog. He was ſenſible next morning of a ſlight cold, but without cough, anxiety, or difficulty of breathing. In the evening, while ſtanding by the parlour-fire, after having drank a glaſs of ſpirits and water, he was ſeized with an aſthmatic paroxyſm, a tickling cough, noiſy reſpiration, and great difficulty in drawing his breath. He was carried up to his bed-room, where, even on the third floor, you could diſtinctly hear his croupy and aſthmatic breathing the moment you entered the door. The paroxyſm, the immediate ſenſe of ſuffocation, ceaſed, but the difficulty of breathing never did. In the firſt moments of his diſtreſs, when profuſe bleedings might have ſaved him, æther, laudanum, hartſhorn, and every ſtimulant and dangerous medicine, were poured in profuſely, and with every doze he ſeemed worſe. In twenty-four hours the aſthma became permanent, the ſpaſmodic conſtriction was unremitting, the crowing of his voice was heard diſtinctly through all parts of the houſe. The ſcene of ſtruggling and agony was unceaſing, and the apoplectic ſtate begun, when I was called to his aſſiſtance, and in my turn requeſted the advice of my valuable and learned friend, Dr Rutherford. He now began to ſlumber and ſnore, his face was purple; his faculties quite obſcured, his neck turgid, his breaſt bedewed with a cold and clammy ſweat; his head hung forward in a ſtate of apoplectic ſtupor, while he was ſupported behind by his brother and friends. He ſometimes lifted his eyes heavily, and again ſtruggled for breath in great agony. The bleedings, and the application of rubefacients and bliſters to his throat and breaſt, ſeemed to give him ſome relief, but we became ſenſible, that after ſuch long-continued ſtruggles, after tugging ſo hard for life, a complete ſtate of apoplexy muſt have taken place in the head, and effuſions of

que tenuis erat, nec eam edere potuit, niſi expectorato cruoris pauxillo, et multa frigidæ copia hauſta; ardebat enim ſiti et ſimul frigido aere continuo afflato indigebat, utcumque minime calida foret tempeſtas; poſt tertiam horam colla a fune impreſſum veſtigium paulatim evaneſcens etiam intumuit, et quartam e jugulo ſuaſi phlebotomiam, apprime percipiens, regreſſum ſanguinis e cerebro mox impeditum iri, unde carus; ſed chirurgis præ metu fugientibus, non inſtituta fuit hæc phlebotomia, unde æger ſenſim obdormivit, pulſus rarior ſenſim evaſit, ita ut vix quadrageſies pulſaret in minuto, minorque evaſit, quem poſt primam phlebotomiam videram ſenſim apparere, et æque raro micare, dein paulo frequentiorem et fortiorem gradatim evaſiſſe; ſic obiit miſer ille, quem nullum ſcelus ad patibulum duxerat."

blood into the cells of the lungs. After reclining three days with his head hanging forward in this ſtate of apoplectic ſtupor, he expired on the fourth.

Upon opening the body, we found the throat ſound, the epiglottis not ſwelled, the glottis relaxed and open, the trachea little inflamed, and no mark of diſeaſe, except a ſmall ulcer, like the baſon of a variolous puſtule, or like a very ſmall chancre, ſeated on the lining membrane of the trachea, juſt within the rima glottidis, and which had excited this unremitting ſpaſm of the glottis, as a foreign body dropping into the opening would have done.

Wherever I have had the unhappineſs to ſee a patient die of ſuffocation, whether ſlow or ſudden, the phenomena of apoplexy have been always the moſt prominent, eſpecially the fulneſs of the head from injected blood, and the inſenſibility and ſtupor from oppreſſed brain. " A lady, who from delicacy and fear had been long of diſcloſing to me a tumor of the thyroid gland, was far gone in pregnancy, and from her new condition, not only oppreſſed, but in continual danger, and already ſeized with the fatal obſtruction of breathing, before ſhe ſent for me. The tumor ſurrounded the whole throat, was ſoft and unequal with matter, which ſoon after burſt out from various points, with an increaſe of ſwelling, and with a hardening which increaſed the conſtriction : and as her bulk increaſed, the agonies, and fits of anxious breathing, became more frequent. The dyſpnœa, in all ſuch caſes, plainly proceeds, not from the mechanical preſſure of the tumor, for it would then be uniform, but from that ſpaſm of the glottis, which any difficulty, either a puſtule within, or a tumor without, produces, and which recurs in paroxyſms.

No ſituation could be imagined more deſolate than this lady's; the child's motions were now diſtinctly felt; the ſize of the womb, and the tumor of the gland, increaſed *pari paſſu;* the face, pale and bloated at other times, was at each paroxyſm of dyſpnœa ſuffuſed and purple. I was called from my bed, from company, from lecture, at all hours, to witneſs her unhappy ſtruggles for breath, which always ended in a ſtate of apoplectic ſtupor. At each paroxyſm, her extremities grew cold, her eyes cloſed, ſo as to ſhew only a ſmall part of the white; her head fell upon her breaſt in a ſtate of inſenſibility, the blood making her face and neck black and livid at the time, and green after each violent ſtruggle from extravaſation; and ſhe lay for many hours ſnoring and oppreſſed.

" When ſhe had attained the eighth month of her pregnancy, I was called one morning very early. She had been ſuffocating for ſome time, and now her face and neck

were actually black with the congeſtion of blood; her head hung forward; her temples were bedewed with a clammy ſweat. Though oppreſſed, and almoſt inſenſible, ſhe ſometimes raiſed her eye languidly, and turned it towards the open window. Her breathing was ſtill, and quiet; after lying thus in the arms of the attendants five hours, oppreſſed, and in a ſtate of deadly ſtupor, her extremities became cold; but before ſhe expired I delivered the child, and was ſenſible, in doing ſo, that the viſcera were cold, and that the circulation began to ceaſe: the child was dead. In this, and all caſes of ſuffocation, I have ever found the laſt ſtruggle terminate in a ſtate of apoplexy; the brain, on account of its peculiar circulation, and extreme delicacy, ſuffering in its eſſential function, while other parts are merely diſcoloured, or ſwelled, by the injected blood. It is the brain alone that ſuffers, it is the congeſtion of the blood that deſtroys *.

On the ill conſequences of indulgences, of particular occupations, of diſeaſes ap-

* My readers will ſmile, perhaps, to ſee me quoting Shakſpeare among Phyſicians and Theologiſts: but not one of all their tribe, populous though it be, could deſcribe ſo exquiſitely the marks of apoplexy, conſpiring with the ſtruggles for life, and the agonies of ſuffocation, to deform the countenance of the dead.

"See how the blood is ſettled in his face!
Oft have I ſeen a timely-parted ghoſt,
Of aſhy ſemblance, meagre, pale, and bloodleſs,
Being all deſcended to the labouring heart;
Who in the conflict that it holds with death,
Attracts the ſame for aidence 'gainſt the enemy;
Which with the heart there cools, and ne'er returneth,
To bluſh and beautify the cheek again.
But ſee, his face is black and full of blood;
His eye-balls farther out than when he lived,
Staring full ghaſtly like a ſtrangled man;
His hair uprear'd, his noſtrils ſtretch'd with ſtruggling;
His hands abroad diſplay'd, as one that gaſp'd
And tugg'd for life, and was by ſtrength ſubdued.
Look, on the ſheets, his hair, you ſee, is ſticking;
His well-proportion'd beard made rough and rugged,
Like to the ſummer's corn by tempeſt lodg'd.
It cannot be, but he was murdered here;
The leaſt of all theſe ſigns were probable."

So curiouſly does our Poet preſent to our conceptions all the ſigns from which it might be inferred that the good Duke Humphrey had died a violent death.

parently ſlight, but really terrible in their conſequences, we are apt to reflect too little; yet nothing is more unqueſtionably true, than that thoſe actions which thus produce ſudden apoplexy by their violence, will, in a ſlighter degree, and operating ſlowly, produce prediſpoſition. The Rachitic, the Aſthmatic, the Deformed, Porters, Coal-heavers, Glaſs-blowers, Trumpeters, and Baſſoon-players, all who have the cheſt naturally ſtraight, and the neck ſhort, or whoſe occupations violently arreſt the breath, or impel the blood into the head, are in danger of apoplexy. Yet this is not the true prediſpoſition: this unnatural obſtruction of the blood, and dilatation of the veins, is not ſo effectual in accumulating blood, as the vigorous action of the arteries. Accidental impulſion of blood into the head ſometimes loads the veins, and compreſſes the brain in an irrecoverable degree; ſometimes burſts through the veſſels, ſo that the patient drops down paralytic, or dead; but it is a ſtate from which, as there is no prediſpoſition, no particular action of the arteries, no previous dilatation of the veins, the patient recovers. Deformity, and other cauſes, producing difficult breathing, do, by operating throughout the courſe of a long life, produce that kind of prediſpoſition to Venous Apoplexy, which is ſo often conſpicuous in old age, which is marked by a habitual lethargy, ſtupor, and hebetude of the ſenſes, and is found after death to be accompanied with a ſerous effuſion. But, apoplexy is a very different diſeaſe, and the prediſpoſition of a moſt peculiar nature: it is an active impulſe, a ſort of hemorrhagic effort in the arteries of the brain, ſo violent, that they often give way, and the apoplexy, or ſtate of oppreſſion, terminates in palſy, or ruined organization. The diſeaſe is not unaptly named by Hoffman, Hæmorrhagia Cerebri.

I am accuſtomed, wherever, in external and ſurgical diſeaſe, I ſee a dilated ſtate of the veins, to look upon it as a ſign of high and irritated action in the correſponding arteries. Wherever the veins are no longer able to reſiſt the action of the arteries, that part or organ is going to wreck. When in tumors, for example, of the breaſt, the teſticles, the ſalivary glands, we ſee the veins rapidly dilating, and the part aſſuming a lurid colour, from ſtagnating or extravaſated blood, we judge that the arterial action is prevailing over the ſtructure of the part, and that ulceration is about to enſue. With perfect confidence do I apply to the brain an obſervation, which, if true, muſt hold in regard to every part and organ of the body.

The apoplectic prediſpoſition does not conſiſt ſolely in dilated veins, but in an irritable ſtate of the arteries of the brain. Prediſpoſition is not peculiar to old age, nor a mere conſequence of that gradual enlargement, and occaſional obſtruction and turgeſcence of veins which increaſes in the courſe of a long life, and which at laſt affects

the function, and is accompanied with ferous effufion. The apoplectic ftroke is fudden; it arifes FROM AN ACTIVE IMPULSE OF BLOOD INTO THE ORGAN, FROM AN EXCITED STATE OF THE ARTERIES; and every patient you lofe, as well as every one you fave, in your future practice, will prove this truth. Often I have faved my patients on the very brink of the precipice: when the temples were jarring with the inward pulfation; the whole frame fhaken at each ftroke of the heart; the pulfe heavy, flow, and ftrong; the face inflated, and the eyes fuffufed with blood; the limbs tottering, and the fenfes beginning to fail, and the fatal ftupor begun! Let who will affirm apoplexy to be debility, the phenomena I have defcribed, mark that critical impulfe of blood into the brain, which would many times, in my own practice, have terminated in the apoplectic ftroke, had I not faved the patient by very copious bleedings, reftoring him to that perfect health and ftrength, which, had he once dropped down, was for ever and irretrievably gone.

Who are they who are moft frequently ftruck with apoplexy, and moft manifeftly predifpofed? Men in the very prime and vigour of life;—men of bulky make, of ftrong and mufcular frame, fquare and athletic, with full heads, fhort necks, a ruddy and fhining countenance, and a coarfe and granulated fkin: men of great bodily ftrength, and choleric paffions: men, whofe whole form indicates great natural vigour of conftitution, relaxed, and bloated, only becaufe they have lived in a perpetual round of indulgence; who, with juft fo much exercife as fupports perfect vigour of health, have taken much high-feafoned food, mixed with wine; have never rejected the pleafures of the table, where "death lies ambufhed in every difh," but ate luxuriouffly, and drunk the inordinate cup.

Of all predifpofition, that which we inherit from parents, and have by nature, that fingular irritability of vafcular fyftem of the brain, which expofes us to fudden excitements, from every flight caufe, is the moft dangerous. As men are born prone to paffion, they are likewife born with this peculiar tendency of blood to the brain, from fudden action of its arteries: Often fo peculiar, and fo ftrong is this idiofyncracy, that a fingle glafs of wine, or a tranfient emotion, or paffion, will excite the arteries of the brain, till the pulfation is felt painfully, and confufion and giddinefs enfue. Many perfons of the moft delicate habits, and the mildeft tempers, have this fufceptibility, fo that they cannot enjoy a full meal, or a moderate fhare of wine, without, not the ufual drowfinefs, but abfolute torpor, and a degree of ftupor, preceded by a heavy pulfation in the head. Many have a fyftem, making blood too faft for its natural ufes, and have the neck, jaws, and head, peculiarly full, and turgid with fuperfluous blood, the eyes prominent, the lips thick, and protru-

ding, the countenance flushed after every meal, or upon the slightest exertion; and such I have seen drop down apoplectic from but a slight aggravation of this plethoric state. Nothing is more universally acknowledged, than that whole families have died of apoplexy, even at early periods of their lives; and, I know, that their disease is a sort of febrile apoplexy, proceeding from an irritable constitution of this part of the vascular system *.

Each paroxysm of pulsation in the head, and threatened apoplexy, is a pure arterial impulse, preceded by no sensible cause, and rising gradually to that heighth of excitement, in which the fulness, the resistance, the increasing distension of the veins, and accumulation of blood, oppresses the brain, and contributes perhaps to abate the action of the arteries. Sometimes this febrile apoplectic impulse lasts, with occasional interruptions, for many days: returns of the pulsation, fits of stupor, and intervals of quietness, succeed each other: the high arterial action, the confusion, headach, and drowsiness, the internal pulsation, which confounds all the senses, and seems to raise the head from the pillow at each stroke, is renewed from time to time. Sickness, and hiccup, and numbness of the limbs, headachs, drowsiness, and stupor ensue. We must watch continually for this beating of the temples, and inflation of the features, this heaviness of the eyes and senses, and that slow strong throbbing pulse which accompanies the attack. This congestion, if hurried on by emetics, instantly terminates in deep apoplexy; and if even it be but neglected, the organization of the brain suffers, exudation of blood takes place slowly, after a long fit of unrelieved stupor, the patient is awakened with a slight distortion of the face, his faculties are impaired, and during all his after life, he trails one limb, for the structure of the brain thus injured never can be restored. This is truly an arterial impulse peculiar to the vessels of the brain, and little connected with febrile or other states of

* "When apoplexy has once affected a person, in the advanced period of life, even if temperate in modes of living, it ought to be a *veto* against the use of all spirituous or fermented liquors. In such conditions of body, it is surprising how small a quantity of wine will induce stupor. A gentleman of my acquaintance was subject to *periodical apoplexy*, (for such I presume to call it, from the frequent attacks), for the last three years of his life. Such was the recurrence of this disease, that certain signs of plethora always indicated an approaching fit. From these premises, I often foretold to his relations the exact period of a new paroxysm. Some paralytic affection commonly remained after each attack, such as hesitation of speech, inability to retain his urine and stools, &c. This gentleman was now upwards of seventy, and had nothing besides that constituted the apoplectic make; he had been accustomed to much country exercise; and always very moderate in the use of wine; but now he could not take two glasses, without defect of voice and speech, and stupor coming on. Yet, in this situation, he had upwards of thirty distinct fits of apoplexy, the greater part of which I saw, and he died in one of them."—*Trotter*, p. 103.

the general ſyſtem; and we are no more to diſpute the viſible ſigns of this impetus of the blood towards the head, becauſe we know not why it ſhould produce apoplexy rather than delirium or madneſs, than we are to deny the high action of the arteries and congeſtion of blood in an inflamed part of the ſkin, becauſe we cannot diſcern what the eſſential difference is betwixt a pimple, a variolous puſtule, or a chancre or venereal ſore.

I have a ſtrong perſuaſion, that the nature or conſequences of this arterial action in the head is not underſtood, but confounded with the general impulſion of blood, from an accelerated circulation, without determination to the head, or, in other terms, without any unuſual action in the veſſels of the brain. "Determination to the head (ſays Dr Crichton) is not the cauſe of drunkenneſs or delirium, for this cauſe is not ſufficient to produce this ſtate on ordinary occaſions. We often (he remarks) have, in conſequence of violent exerciſes, a particular determination to the head without delirium." We have, indeed, from exerciſe, a heated body, and accelerated pulſe, and throbbing of the temples, but the pulſes of the head are not more violent than in other parts of the body; the one thing wanting is a particular determination to the head. "Beſides, (ſays Dr Crichton), there are many inſtances of people labouring under acute rheumatiſm, and pneumonia, whoſe pulſe beats 120 in the minute for ſeveral days, and yet have no delirium *." But it is not to be acknowledged, that often in acute rheumatiſm, or pneumonia, when the pulſe is thus hurried, and the ſyſtem in a febrile ſtate, there is delirium: What then is the difference in the two ſtates of the ſyſtem? Difference in the general actions of the vaſcular ſyſtem there cannot be, nor any riſing of the pulſe, for it can hardly exceed 120, except at the approach of death: what then can be ſuppoſed wanting in the one caſe, or peculiar in the other, but a determination to the head? What would be the effect of giving, (in ſuch a hurried ſtate of the circulation), an ordinate doze of opium, or ſpirits? What would be the effect of noiſe, confuſion, or paſſion, but to throw the patient into a paroxyſm of delirium? Theſe are the peculiar excitements to the blood-veſſels of the brain, and being ſuperadded to any febrile condition of the body, produce what is alone wanting, a determination towards the head. When a high pulſe, and febrile ſtate, is excited by bodily exerciſe, the head is clear; when excited by opium, wine, paſſion, or emotion, by blows, or injuries of the head, by febrile infection, or particular poiſons, by the burning heat of a tropical ſun, by any thing peculiarly calculated to excite the arteries of the brain, the firſt ſign of commotion is the throbbing of the

* Vol. i. p. 134.

temples, and confuſion of the ſenſes, while the febrile ſtate of the body is ſo ſlight as to paſs unobſerved. Impetuous exerciſes, or violent ſtruggles, running, blowing, coughing, aſthma, may drive the blood towards the head, and that with ſuch violence as to burſt its arteries; as in a diver, the blood often, in deſcending to great depths, burſting from the mouth and noſtrils. But if, while the body is quieſcent, the pulſe calm, the paſſions at reſt, and no unuſual, no viſible cauſe operating, there comes a throbbing of the temples, and confuſion of the ſenſes; if the arteries of the brain begin ſuch violent action, while other parts of the vaſcular ſyſtem are in ordinary action, then do we witneſs what is juſtly named a determination to the head; and Apoplexy, Convulſion, Palſy, or ſome horrible diſorder enſues.

With what ſudden unpremeditated violence ſuch impetus takes place, may be well exemplified in the caſe related by Drelincurtius. Under what title ſuch phenomena is recorded, whether the arterial impulſe only fills the head with blood, or burſts through the extreme veſſels; whether the patient is ſtruck more frequently with apoplexy, or falls down paralytic, or labours in convulſions, in conſequence of ſuch impulſe of blood, is not now an object of inquiry, ſince my whole deſign is to ſhew the ſuddenneſs of the ſtroke, and to illuſtrate what I have ſaid in a former page, that the arteries of the brain are ſometimes excited to inordinate action, as ſuddenly as thoſe of the cheek in bluſhing, or of the penis in erection.

"When I was firſt called, on Wedneſday the 7th of March 1664, (ſays Drelincurtius), to this young man, who was about eighteen years of age, I found him, lying without ſenſe or motion, the reſpiration and pulſe almoſt ſuſpended. I had often ſeen him, recollected his perſon, and learnt from his friends, that he was of a vigorous and athletic form, fleſhy, and full of blood, accuſtomed to live well, and habitually ſubject to bleedings from the noſe. He had that day dined plentifully, and having walked out about two hours after, was preparing to play a match at tennis; but, before he had begun to play, or entered at all into this violent exerciſe, he ſuddenly fell down, the blood guſhed from his noſe, his eyes were diſtorted, and ſeemed as if they would burſt from their ſockets; he vomited, and paſſed his urine and fæces inconſciouſly; he lay ſtruggling and toſſing his limbs, while the foam iſſued from his mouth; his voice, ſenſes, and reaſon, were gone, he gnaſhed with his teeth at thoſe who approached to help him. This was the relation that the keeper of the tennis-court, terrified at what he had witneſſed, gave to the friends: this was the firſt time this young man was ſo affected: this horrible convulſion came on without any external injury, or apparent cauſe.

" The young man (ſays Drelincurtius) being conveyed to his own bed, I was immediately called, and I found him ſtill vomiting, convulſed, grinding his teeth, and foaming at the mouth; his reaſon was diſordered, and the pulſe and breathing quick, but interrupted; yet for a little while it ſeemed as if this agitating ſcene would ceaſe. This proved a vain expectation; after exclaiming, Oh my head! my God! how has this come upon me! after being ſeized with ſeverer vomiting, and calling to his attendants and friends to ſtand aſide, he fell into convulſions, increaſing every moment in violence, and about ſix o'clock in the morning he expired.

" The firſt appearance of the corpſe was ſhocking, ſo livid were the head, neck, and ſhoulders, with the blood impelled into them; while bloody foam ſtill iſſued from the mouth. Upon opening the ſcull, we found the veſſels upon the membranes of the brain ſo turgid with blood, that though ſtill contained within its veſſels, it was coagulated into black knots, while the ſerum of this coagulated blood exuded through every pore and opening; and we found, and gathered up with the points of our fingers, ſeveral ſpoonfuls of effuſed blood, which, by the rupture of the ſmaller arteries of the brain, was extravaſated upon its ſurface, and inſinuated into all its convolutions and cavities. We alſo obſerved, (ſays Drelincurtius), that the blood was effuſed chiefly about the place of the mammillary proceſs, where it was not yet coagulated, though it continued after death to flow in a ſtream from the mouth and noſe."

In youth, while there is no prediſpoſition, no loſs of balance betwixt the arteries and veins, and in a caſe of arterial impulſe ſo ſudden as this, the blood has no time to accumulate, before ſome fatal accident happens: the apoplectic ſtate is never fully formed: the patient is convulſed, but not inſenſible. I ſhall be at no loſs to prove to you, by innumerable examples, how very ſlight the difference is betwixt the convulſed and apoplectic ſtates, that they are almoſt two ſtages or degrees of one affection; that convulſion might almoſt be named the apoplexy of boys and young men; that in youth, when the arterial impulſe is ſudden, and the veins as yet undilated, the patient falls down convulſed, the blood burſting thus from the mouth and noſtrils; the ſame impulſe, continued, renewed, leſs violent in degree, or leſs ſudden in its operation, produces complete apoplexy.

" A young gentleman, whoſe form and features marked him as prediſpoſed in a particular manner to this diſeaſe, died a very ſudden and dreadful death, at the age of twenty-two years. The peculiarities of his form were ſingularly expreſſive of this active and turgeſcent ſtate of the veſſels of the brain, in ſo much, that a phyſician, of ſtrong natural diſcernment, predicted this danger, while he was yet a boy.

His limbs were clean, ſlender, muſcular, and firm. The bulk of his body increaſed towards the ſhoulders, which were ſtrong, muſcular, and round, in ſo much as to give an appearance of ſtooping; his neck was extremely ſhort, his head large and round, his face flat and full, his lips and cheeks protruding, the neck and joining of the head, eſpecially about the angle of the jaws, fleſhy, and the temples, and thoſe parts of the head which in others are bony, were in him thick, plump, and cuſhion-like. Theſe peculiarities I was particularly called to obſerve, and I recollect them very diſtinctly.

" The arterial impulſe towards the head was, in this young gentleman, who was eminently diſtinguiſhed for talents and genius, of a febrile nature. If he ſpent a day in hunting, ſat in his wet cloaths, and drank, though but ſparingly, of ſpirits and water, he had a heavy headach, a ſuffuſion of the eyes, a puffing up of the face, and a full and throbbing pulſe. The firſt time this affection amounted to diſeaſe, was after a day of hunting, and hot exerciſe, at which time he fell down in a ſort of fit, and was in ſome danger of ſuffocating in a burn near which he fell. This, and one other paroxyſm, he concealed in kindneſs to his friends; but that it was of an epileptic nature, I know from this, that the third paroxyſm, which happened at the diſtance of ſeveral months from the ſecond, and which was the occaſion of my being called to him, was preceded by a flaſh or beam of light, which he felt while ſitting at his ſtudying-table, and the import of which he perfectly underſtood. This feeling alarmed him; he ſtarted up, ran into an adjoining room, and ſuffered a fit of convulſion not very ſevere. This was at the diſtance, I believe, of ſix months from his ſecond attack, was cauſed by the ſame ſlight errors, in hunting, ſitting in wet cloaths, and drinking in the evening a little ſpirits and water, in ſpite of the earneſt remonſtrances of his friends, although within the very ſtricteſt rules of moderation, in ſuch quantity as would have affected no other perſon. His convulſion was preceded by that heavy headach, which he dreaded as much as the beam of light. On the evening of the third day, while I was ſitting with him at the tea-table, and another gentleman of our profeſſion, his particular friend, and common attendant, in company, engaged in general and chearful converſation, in which our patient took his part with great hilarity, he roſe with apparent deliberation from the tea-table, turned round into the adjoining room, and, in a few minutes, when I followed him, I found him lying convulſed in the moſt dreadful paroxyſm I had ever witneſſed. His neck ſeemed inflated, his face black with blood, his eyes ſtarting from his head, his tongue ſwollen, and projecting ſo as to fill his mouth, his lips protruded, and actually black, and his whole body ſtiffened with convulſion, but neither ſtruggling

nor diſtorted. We inſtantly bolted the door, to prevent uſeleſs alarm; untied his neck-cloaths; his friend and his ſervant ſupported him; and I bled him from the arm ſo profuſely, ſo ſuddenly, and from ſo large an orifice, that the moſt vigorous man in health muſt have fainted under it. Inſtantly, and before I thought it neceſſary to ſtop the blood, his convulſion relaxed, his face reſumed its natural colour, he opened his eyes, and knew us; in a few ſeconds, he was able to mutter a few words: Yet, for a quarter of an hour, he lay in a ſtate of torpor, ſenſible, in ſome degree conſcious of the ſcene around him, able to anſwer, but unwilling to be rouſed.

"He was thus ſaved from the conſequences of a paroxyſm, which, had it been permitted to laſt, would, I am perſuaded, have ended in effuſion into the brain, with palſy, or irrecoverable apoplexy. The bliſters over all the head, the iſſues in the neck, and the draſtic purges which were ordered in a general conſultation, reſtored him to apparent health. Some laxative medicines were preſcribed, to be uſed from time to time; but I ſhall ever regret, that the wiſhes I repeatedly and earneſtly expreſſed, of having him ſent to a watering-place, purged for months with ſaline waters, limited to the ſevereſt regimen, reduced in his whole habit, and kept ſo during all the earlier part of life, were neglected. It is in vain to ſay ſuch diſorder is nervous, that we hope it will not return: ſuch arterial impulſe, having once taken place, will infallibly return: having once exiſted, the prediſpoſition muſt, through life, continue to exiſt: it is never, after it is once declared, to be treated as a thing unknown, or only ſuſpected. The patient who wiſhes to live in ſafety, after ſo awful a warning, muſt live by rules the ſevereſt, and moſt mortifying. "Nullus eſt morbus, quem diu ante facilius præſagire poſſis, nullus quem adultum difficilius expellas. Indefinenter ergo ſuadere deberent medici, periculum in quo conjicit ignavia, circa leves illos paroxyſmos apoplexiæ prodromos. Præcavetur facile, raro integre ſanantur *."

At the diſtance of nine months from this dreadful attack, after living a very temperate and abſtemious life, guiltleſs of every error, but that of ſevere application to ſtudy, the ſame ſlight irregularities excited again this dreadful impulſe of blood towards the head; for a few days he had complained of that portentous pain, weight, and fulneſs within the head, which had preceded each former attack; and his medical friend bled and purged him, by way of prevention, and enjoined abſtemiouſneſs and quiet. He went a-ſhooting, and ſat in the wet cloaths in which he returned;

* Tiſſot, p. 23.

drank a little ſpirits and water in the evening, and next night he ſupped abroad, in ſpite of every remonſtrance, drank with all round the table of a weak white wine, which he ſuppoſed little heating, (ſo very ſlight are the cauſes to which the moſt diſaſtrous conſequences may be referred): Next day, he felt the coldneſs and ſlight ſhiverings, which indicated always the approaching paroxyſm. He was alternately hot and cold; his eyes ſuffuſed, as if injected; his face turgid, with the uſual pained, heavy, and confuſed feeling within the head; and along with theſe ſlight ſhiverings, he had as uſual a full and throbbing pulſe, very different from its natural and quiet ſtate. Next day, when his brother went to call him, in the morning, he found him complaining of headach and confuſion, and he ſaid, (conſcious of his confuſed ſtate), "Surely I muſt have been unwell during the night." All that day his face was particularly turgid, his temples throbbing, and he had frequent irregular and convulſive twitches: On the ſecond morning, he was inſenſible. It never could be aſcertained, whether on either of theſe days he had ſuffered any degree of convulſion. That he had ſuffered an epileptic paroxyſm, is not to be ſuppoſed, for his tongue was not ſwelled nor injured. But the impulſe towards the head had been ſlowly and regularly increaſing; he had not been bled; leeches only were applied to his temple, a ſlight and trivial evacuation, God knows! and altogether diſproportioned to ſo dangerous a ſtate of the circulation in the head *. He lay now quite comatoſe; his head ſeemed ſwelled with the congeſtion of blood; his eyes were ſuffuſed, and but half open; he had a frequent catching, and twitches, as if his whole frame had been agitated by a ſlight convulſion, but no paralyſis, except of the tongue; he lay extended, generally inſenſible, except when rouſed; his head fell always down from the pillow; he muttered and talked very indiſtinctly; when rouſed, he became more ſenſible, but preſently relapſed into a ſtate of torpor: When importuned by his friends, or when aſked, whether he knew his attendants? he replied with an inclination of the head, and an indiſtinct grunt, as of aſſent. When aſked, Will you take a little of this drink? he uſually anſwered, Yes, in a very ſhort and hurried manner, and took the drink when preſented. He lay in a ſtate of almoſt continual torpor; the longer his ſlumber was of being interrupted, the convulſive twitches, though ſtill ſlight, ſeemed more frequent. From the moment of his falling into this apoplectic ſtate, he never ſpoke diſtinctly, could never be rouſed but for a moment: his ſlumber and ſnoring became every hour heavier and deeper; he became gra-

* I was called: Dr Monro, who had formerly viſited him, and been of the conſultation, was alſo called, but we were abroad: His particular friend and regular attendant was alſo moſt unfortunately from home.

dually more insensible, and without any involuntary evacuation of urine, or fæces, expired on the fourth day.

DISSECTION.

"THESE are circumstances in which we might have predicted, that the pure apoplectic state would prevail; that there would be found inflamed membranes, and dilated blood-vessels, but no extravasation into the cavities or substance of the brain. The veins, upon raising the dura mater, were found uncommonly turgid with blood; the pia mater extremely red, vascular, and seemingly injected; the medullary substance of the brain was not, as in its natural state, white and cineritious, but actually red, as if delicately injected with size, and the bloody points marking the sections of its blood-vessels extremely numerous and large. Upon cutting the hemisphere, layer after layer, till a thin and transparent roof only was left covering the ventricle, there issued, upon puncturing it with a bleeding lancet, several ounces of serum, clear and watery, and but very slightly tinged with blood; all the little arteries which ply round the optic nerves, and cover the basis of the brain, were red, turgid, and as if subtilly injected. The appearance most remarkable and striking, was the universal redness of the substance of the brain; the inflamed colour and appearance of injected vessels was still more conspicuous over all the basis, than on the upper surface of the brain. There was no where the slightest appearance of extravasation or bloody effusion, either by laceration or by anastomosis, *i. e.* from dilated extremities of the arteries."

This sudden arterial action I will illustrate with one instance more, the case of a gentleman well known in our profession, who, from a spirit of enterprise and public duty, embarked with Lord Elgin on his embassy to Turkey, with the design of investigating the nature of the plague, and of reforming the quarantine laws *. "This gentleman inherited a marked tendency to this disease, of which his mother and sister died †. He was of an athletic form, of a full habit, of coarse skin, and

* Dr Hector M'Lean, Author of "An Inquiry into the Nature and Causes of the Mortality of the Troops in St Domingo," where he performed his duties, I am sure, with good sense and zeal, and lived in a manner so hospitable, kind, and good, that I find his fellow-officers speak of him with respect and affection.

† Wepfer says, "Norunt omnes expertes Philiatri, apoplexiam esse ex illorum morborum genere quos hereditarios vocant, et qui a parentibus in filios charactere seminali propagantur, ita ut certe stemmati fatales esse, aut ita natos disponere soleant, ut eidem morbo magis sint obnoxii." Forrestus relates a case of apoplexy in one, whose father and all his brothers had died of the same disease.

florid complexion, of ſtrong natural abilities, and addicted to the pleaſures of the table, to good fellowſhip and wine: the prediſpoſition was, in every circumſtance of his perſon and habits, ſtrongly marked: in every variety of climate, in the Eaſt and in the Weſt Indies, he had always lived very full. During his voyage to Conſtantinople, in the ſuite of an ambaſſador, and ſurrounded with every luxury of the table, without a motive for even his uſual exerciſe, and with incitements to indulgence from which he was ill able to refrain, he "made much blood," and was conſcious, that on his arrival in Turkey, his ſyſtem was in a dangerous ſtate of plethora, marked by a torpor, liſtleſſneſs, ſickneſs, and manifeſt determination of blood to the head, with frequent hemorrhagies from the noſe. On the 2d of November, after a voyage of ſome weeks, he arrived at Conſtantinople, and continued in tolerable health till the month of February, when he was ſenſible at once of unuſual torpor and ſevere ſickneſs; his appetite entirely failed; after every meal ſickneſs and torpor enſued; he was ill till he vomited, and then he fell into a profound ſleep. Though conſcious that his faculties of every kind were greatly impaired, he was yet unconſcious of the extent of his danger, unmindful of his hereditary prediſpoſition to apoplexy, and ſlumbered on without reforming his ſyſtem of life, without betaking himſelf to needful exerciſe, or uſing the ſalutary and neceſſary evacuations of bleeding and purging: he continued, in ſhort, to live luxurioſly, to eat, drink, and ſleep, abundantly, till he fell into a febrile apoplexy, of which every preceding day may be ſaid to have been a leſſer paroxyſm, the blood ſtill accumulating from natural and irreſiſtible cauſes.

"Towards the end of February, or early in March, his faculties were quite obſcured; he loathed his food; he rejected it with ſickneſs and nauſea; he felt unfit for exertion, forgot what he read, and had a perpetual lethargy. When he firſt, after ſitting long, began to walk, he was ſenſible of a heavineſs in the right leg, but ſtill he was not alarmed.

"On the 16th of March, when preparing to accompany Lord Elgin to dinner at the Auſtrian Ambaſſador's, he was ſeized with a violent hiccup and vomiting, which unhappily he tried to appeaſe with wine and opium, but found it ſuch as nothing could reſtrain: The blood was now propelled towards the head in a great volume; as he lay in bed, the pulſes in his head ſeemed to raiſe it from the pillow, and jarred his whole frame at every ſtroke. Dr Wittman, of the artillery, who was called to his aſſiſtance, did not bleed him in this critical moment; he laboured

all night with this hiccup, and lay in great mifery from the violence of the pulfations, and the conviction that he fhould have been largely blooded.

" In the morning, Dr Wittman was again called, who confented then to bleed him; and his pulfe, in place of being abated, fenfibly rofe in the ftrength and frequency of the ftrokes: it throbbed fuller and ftronger: though he had loft fixteen ounces of blood, he ftill felt the heavy and throbbing pulfations in the head, and counted them by the ear more diftinctly than at firft. Towards evening, he fell into a profound apoplectic fleep; he lay buried in this ftupor all night; he was roufed in the morning with great difficulty; he was paralytic; his leg and hand of the right fide lay powerlefs; his tongue was affected; he could not fpeak; he felt a peculiar fenfe of numbnefs all around the right fide of his jaws, as if in the teeth.

" Not the moft profufe evacuations could now prevent the confequences of that injury which the brain had already fuffered, yet what was now done too late to prevent the palfy, contributed to fave his life. He was bled daily during ten fucceffive days, to the extent of twelve ounces; during all that period, he heard diftinctly each ftroke of the arteries within his head; but gradually this diminifhed, and he was left to feel all the mifery and languor naturally refulting from the irreparable injury which the organifation of the brain had fuftained. His memory and all his faculties feemed to fail him; he forgot names entirely, and remembered nothing but what he was guided to by the moft direct affociation; his tongue recovered; the numbnefs of the thigh vanifhed; but his leg and arm continued palfied, fo that, though he could walk, it was very lamely, and he could not write. Dr Wittman, whofe kindnefs was now a great folace to him, blifered and electrified the palfied limb, but without effect; he enjoined a fpare diet of vegetables, and an almoft total abftinence from wine. During fix months he languifhed in this condition; his appetite was gone; his reft forfook him entirely; and in defpair, he fought relief from opium, taking it more profufely than the moft debauched Turk, for he increafed his evening's dofe to 500 drops, which completed his ruin. It was an act of defpair; his judgement was weakened, his conftancy of mind quite fubdued, and he could not refrain from what gave relief; he loft the power of retaining his urine; he was in a ftate of conftipation continually; and often he rofe in the morning with the tremors which follow a debauch. He tried the warm baths of Conftantinople, and, at the fuggeftion of his friends, went to try thofe of Brufa on Mount Olympus, where, by ufing the bath too hot, and every day,

he, during the ſix weeks that he remained there, got daily worſe. Every thing, he is now conſcious upon recollection, tended at this time to ruin utterly his nervous ſyſtem; he ſtill, though under a ſtrict regimen, and with an impaired appetite, made much blood, and continued to ſtimulate his brain with opium, and rarify his blood by the hotteſt baths. Conſcious of being very full of blood, he required Dr Stuart, phyſician to the expatriated family of Stuart, to bleed him, which was done repeatedly, about ſixteen times during his reſidence at the baths.

"After ſojourning at Smyrna, Rhodes, and Malta, and having touched at Gibraltar, he took his paſſage home, and arrived in that ſtate of health from which it was not eaſy to look for a perfect recovery. His diſappointments in all thoſe remedies which friends or books have ſuggeſted to him, need not be enumerated: the precautions and reſtrictions ſuggeſted by Drs Rutherford and Monro, joined with me in conſultation, relate only to that plethoric habit, which is ſtill ſo ſtrongly marked in Dr M'Lean's conſtitution; our chief anxiety has been to ſave him from future attacks, or further injury to the brain."

The ſlighteſt ſketch of an affection of this very peculiar nature, the ſlighteſt intimation of the courſe of a violent arterial action ruining the organization, ſhould ſurely put a ſtop to the outcry againſt bleeding, and to the uſe of ſtimulant drugs. The phyſician who knows the peculiar ſigns of this arterial action within the brain, and is aware of its danger, will allow no bliſters to be applied in the moment of attack; no emetics, no opiates, no wine, no warm drinks; no ſudorifics, which are univerſal ſtimulants, accelerating the circulation through the whole frame; no emotions of the mind; but will enjoin quiet and coolneſs, refrigerative applications to the head, antimony and calomel calculated to ſicken and to purge, and will ſet no bounds to the uſe of the lancet, but the duration or violence of the arterial action; his remedies will be boldly and deciſively adminiſtered, till that action be ſubdued, and his care and watchfulneſs unremitting, leſt it ſhould return.

On theſe points, the leſſons I have laid before you muſt be perſuaſive; nor can it require any proof, that the apoplectic ſtate is a ſtate of excitement, and high arterial action in the veſſels of the brain. Yet I am not unwilling to add to my deſcriptions what I might almoſt call a definition by Burſarius, ſo conciſely does it expreſs all that I have imagined or deſcribed of the ſtate of the whole ſyſtem. Burſarius ſeems to have been doubtful whether the arteries of the head could be excited ſo ſuddenly as to cauſe the apoplectic ſtroke. Unwilling to attribute effects ſo

sudden to a direct excitement, he has imagined, like Cullen, that a spasm might be interposed to explain a fact he could not deny. Bursarius seems to imagine that when from passion or emotion, from anger or terror, a man is struck down, his system is thrown into a spasmodic or convulsive state, whence apoplexy is produced *: Yet every circumstance, even in the approach of such apoplexy, as described by Bursarius, imports its febrile nature: "Its approach is announced by cold extremities and a burning skin: the face and eyes inflamed, the carotid arteries beating quick and strong, while all the pulses of the body throb powerfully †."

Let us then observe the patient in this state of approaching apoplexy, by far the most frequent, and fortunately the most curable: for the apoplexy of old age, proceeding from dilated veins, imperfect absorption, a circulation in the brain habitually difficult, and a consequent effusion of serum, a torpor gradually increasing, in which, when we dissect the body, we hardly know to which cause to ascribe the death, whether to veinous congestion or serous effusion, is extremely difficult to cure. The man struck with the sanguineous apoplexy of Senertus, if he has been attentive to his feelings, has been conscious of a beating of the temples, confusion of head, and subsequent torpor. His first feelings are headache, confusion, and a loaded feeling. There is a violent throbbing of the temples, while a degree of sickness accompanies the headache: but, when the pulse begins to beat slow, heavy, and oppressed, and the confusion of head is changed into torpor, the apoplectic state is begun.

This is the CAROS, the APOPLEXIA MINOR, APOPLEXIA LEVIS, of Hippocrates; the slighter or milder apoplexy: in which the impulse is slight, the texture of the brain no way injured, and the accumulation of blood not irrecoverable: but the patient who is struck with the APOPLEXIA FORTIS, the DEEP APOPLEXY, lies buried in a deep lethargic sleep, from which he cannot be roused; his mouth is half open, while frothy saliva bubbles from it at every breath; his face is purple and dark; his eyes staring like one in the moment of suffocation; his nostrils dilated; his mouth swelled; his lips protruded, and his breath is delivered with unpremeditated bursts from the lips, and a snoring noise from the nostrils: his breathing is slow and heavy; his pulse full and big, and very slow; his face agitated

* Proximum est, ut de signis apoplexiae convulsive seu spasticae quae nimirum a spasmis originem ducit, disseramus. Huic obnoxii sunt qui hypochondriaca vel hysterica fussione subitisque animi motibus, ira terrore aut epilepsia vexantur, &c. page 84.

† "Simul ac in propinquo est, extrema perfrigerentur, cutis arrescit, facies oculique rubent, arteriae carotides validius celeriusque micant; reliquae magnum durumque pulsum exhibent," § ciii.

sometimes with twitches, which distort the mouth, and his limbs sometimes disordered with slight irregular convulsions; his temples are bedewed with a clammy sweat; his feet cold; his limbs are more commonly paralysed and relaxed. As the oppression advances towards this degree, he may be roused: then he stares wildly about him, answers with a monosyllable or nodding of the head; often stirs his limbs as if under sensible oppression, and lifts his hand as if to relieve his head. When the deep apoplexy is come on, the face is deep purple, (atro-rubens,) and the breathing strongly stertorous: no excitement can rouse the patient to motion: his eyes are fixed and staring like a strangled person's, or half closed: he may be turned, pinched, or even cauterised, without his showing any sign of sensibility; he lies along, heavy and motionless, like a log: if he is to revive, he struggles more; he looks about him wild and delirious; he seems to know his friends, and swallows what is put to his lips: but if he is to die, his deglutition is more difficult; he suffocates when you pour any fluid into his mouth; his extremities grow colder; his pulse slower and feeble; his face becomes pale and contracted; he passes his urine and faeces involuntarily, and expires.

From various degrees and kinds of torpor, which shall by and bye be defined, this the true apoplexy is distinguished by certain pathognomonic signs, the succession of which is very particular: by a deep torpor and loss of sense; by stertorous breathing; a slow pulse; and relaxation of all the body. What is this stertorous breathing which distinguishes true apoplexy? It is the consequence and the sign of all the senses being oppressed, and all the vital motions injured, and is the same in apoplexy where the brain is universally gorged with blood, as when the neck is broken by a fall, and the man lies paralytic of all the body. By the impetuous course of the blood towards the head, the face is turgid, while internally the substance of the brain is compressed: by the compression of the substance of the brain, the body becomes insensible, so that it may be cauterised without shrinking, and all the limbs and joints are relaxed and extremely flexible: The vital functions of breathing and circulation are also slow, owing to compression of the brain; thus, in fractured scull, the depressed bone or extravasated blood is taken away, the pulse rises, and the respiration becomes free at the same moment that the patient opens his eyes and stirs his limbs. The breathing is stertorous or noisy in the true apoplexy, because the lips, being paralytic, are collapsed and fallen together, and swelled along with the other features by the general afflux of blood, is the reason of each respiration being delivered with a sudden burst, the swelled lips being opened by each impulse of the slow, heavy, and irregular respiration: and as the stertor is the peculiar

and pathognomonic sign of apoplexy, by the degree of stertor are we to judge of the degree of oppression. "Stertor est caeteris paribus mensura periculi," (Sauvages.)

Palsy of one side is supposed to be favourable to the patient's recovery, only because it appears when the patient recovers: it is the effect of bursting among the smaller vessels within the brain: when such ecchymosis is large, and the brain much injured, the apoplexy grows deeper, and the patient dies; but when less extensive, he survives, and survives paralytic: The distortion of the mouth, or the paralysis of one side, can only be observed when the senses are restored, and the other side begins to move: but when we observe carefully the patient, who lies in a deep apoplexy, we can perceive that one side lies very still while the other is slightly convulsed. Palsy, implying an effusion of blood into the substance of the brain, may be so slight as not to prevent recovery, and to appear only when the senses and feeling are restored; it may even have some relation to the cure, to the conclusion of the apoplectic paroxysm. But it is, I believe, a universal fact, my experience in fractures of the scull at least instructs me so, that wherever there is distinguishable paralysis, or strong convulsion during the apoplectic state,—wherever the sphincters of the rectum and bladder are relaxed, and one side is convulsed while the other is palsied,—the patient dies.

Apoplexy is a dreadful, almost incurable, disease. That it is a disease, not of high excitement of the nervous power, as is usually said, and exhausted excitability, but of impetuous action of the arteries, is beyond dispute: though nothing of the predisposition tended to prove this, all the intermediate causes, and even the scene in which a man is struck with the apoplexy, would put this beyond any doubt. That it should be an irrecoverable disease *, must seem natural to those who foresee the consequences of such impetuous destructive circulation in an organ not supported when in a state of suffering, nor capable of being restored, by the healthy circulation of adjoining parts, but in whose disorder the whole body partakes, by whose diseases all the vital functions are affected. When the circulation of a limb is powerfully excited by injury or spontaneous disease; when the whole member throbs with pulsating pain, and reddens from intense circulation, a cellular effusion comes on, which moderates, checks, and represses that high arterial action, and leads to resolution; unless, indeed, the extravasation be so great as to cause gangrene. But in the brain, the mere fullness of vessels

* "Omnis Apoplexia Sanguinea et Apoplexiam fortem tollere ut plurimum est impossibile."—*Sauvages, Classis VI. Debilitates.*

oppresses its function, even before effusion takes place; and the slightest degree of effusion added to that oppression, causes paralysis of the whole body, and lessens the pulses of the heart, and the play of the lungs; thence the stertor, and all the mortal phenomena of apoplexy.

Excitement alone, as the stimuli of passion, wine, or opium, causes a temporary apoplexy; but predisposition is necessary to constitute it a fatal disease. The excitement, even from any one of these stimuli, presents to us all the phenomena of apoplexy. Intoxication is an epitome of all the stages of excited action and vascular congestion; but being in a sound organ, not predisposed, it ends not in apoplexy, but in recovery, less perfect indeed at every renewed debauch, and attended, even at the best, with giddiness and disorders of the head, trembling of the hands, low spirits, and a disordered stomach: but, conjoined with other excitements, or, in a predisposed system, intoxication ends, like apoplexy, in palsy or death. The first effects of wine are hilarity and mirth, pleasurable sensations, lively conceptions, unusual and brilliant combinations, unpremeditated flashes of wit, and merriment, to set the table in a roar; till laughing, singing, howling, and all the delirium of drunkenness succeeds. In the next degree, are jealousies and quarrels causeless and inextricable; threats, reproaches, imprecations, "Swords out, and tilting at each others breasts, as if some planet had unwitted men;" till excitement ends in torpor, stupidity, and temporary palsy: Then the intellect, the senses, the muscular powers fail; the pallid and distorted features, the staggering gait, the paralytic dangling of the hands, the babbling and hesitating speech, betray the state of the sensorium. "Seen dim and blue, the double tapers "dance, like the sun wading through the misty sky." "Their feeble tongues, un-"able to take up the cumbrous words, lie quite dissolved;" till, overpowered, the drunkard sinks down, and all the scene is buried in oblivion: he lies in profound insensibility, in a sleep almost apoplectic, with snoring and stertor; the face is bloated and swollen, the pulse oppressed and slow, and if he dies, he dies apoplectic, with the vessels of the brain gorged with blood.

That apoplexy does not always ensue, proceeds from want of predisposition, and from the determination to the head being limited by the temporary nature of this excitement: But frequent excitement, and arterial action often renewed, begets at last veinous congestion and serous effusion; hence drunkenness produces that predisposition, the absence of which makes the first indulgence in some degree safe: the headaches and the debilitated stomach are from congestion of blood and increased effusion, whence the cavities of the brain are enlarged; the trembling hands and tottering limbs, and emaciated frame of the confirmed drunkard, show the degree in which

the brain has suffered; and daily excesses confirm the organic disorder, and lead to palsy, to premature old age, to second childishness and mere oblivion.

The paroxysm of furious intoxication is thus succeeded by accummulation of blood within the head, and apoplectic oppression; if other excitements of heat, noise, lights, passionate declamations, quarrels and reconciliations, temporary interruptions of intemperance, and renewed debauches follow; if, after the highest state of excited circulation and incipient oppression, the person is tumbled into a carriage, lies there in a distorted posture, and is driven for miles furiously by servants, drunk as their lords,—complete apoplexy ensues *. Nay, independent of any very particular cause,

* How very often soldiers, sailors, and labourers, are found lying under a wall apoplectic, and dying from pure intoxication, need hardly be told. Carters and others, who get into their carts, and are rumbled along a rough pavement, in crooked postures, with their heads declining and their necks crooked, are often taken out by their friends apoplectic and dying. "I remember (says Shenkius) many such deaths. A merchant, having dined at a village not far from Alkmar, was tumbled, drunk and grunting like a sow, into the bottom of a boat; where the boatman, as drunk almost as his passenger, left him lying on his back, and believed him in a sound sleep; but when, having arrived at Alkmar, he stirred him, and wanted him to rise and get out, he found him dead." "Two brothers returning very drunk from the fast at the Hague, the one lay on the other's breast, and snored, so that all the other passengers in the coach, believed him to be sound asleep, though he did not answer when spoke to, nor seemed to feel the extraordinary velocity with which they were whirled along; for the coachmen, (who take the privilege at such times of being as drunk as those within), had laid the reins on the horses necks: this man, who was of a coarse full habit of body, was carried into his house in a state of insensibility and stertor, and died before his family could call for help." "At another time, the driver from Alkmar to Harlem being very drunk, the company tumbled him down into the back of the waggon, and set another fellow to drive; but, when they arrived at Harlem, they found him dead, though they had heard him snore."

The frequency of apoplexy in Holland has been imputed to their moist and cold climate: I fear it is rather to be imputed to that which they regard as the best preservative against the moisture and cold. In short your Hollander is too well acquainted with Corporal Trim's doctrine of the radical heat and the radical moisture; the Corporal considered the radical moisture to be the ditch-water, and the radical heat, by which it was to be expelled, as right Geneva.

Interim memini quendam Simonem Barbrandum, quoque Alchmarianum, qui mercaturae causa frequenter Coloniam proficiscebatur, à potu convulsum periisse. Hic autem cum in pago non procul ab Alchmaria urbe patria mea, egregiè potasset, ac in scapha vino oppletus, porcorum more stertens, in dorso jacens, domum veheretur, nauclerus etiam ebrius existens eum dormire ratus est. Verum cum Alchmariam appulisset, ut ex scapha exiret, et nauclerus eum alloqueretur, et diu dormientem (ut existimabat) arriperet, hominem praeter exspectationem mortuum invenit.——*Forestus Schol. ad observat.* 27. *lib.* 9.

Ex ebrietate convulsi, et subito mortui.—Petrus ille Jacobus Delfius, vir admodum crassus, qui ad partem urbis orientalem habitabat, anno 1563, cum in Haghensi dedicatione (in qua more solito Bac-

such a life is attended with too many shocking varieties, not to have often a dismal, disgraceful, conclusion; often, in some fit of apoplectic torpor, and just before the vessels cease from their high action, they give way, and, after lying buried in an apoplectic sleep, the drunkard, when roused by his friends or servants, wakens difficultly, imperfectly, with a confusion of the senses, a wildness of aspect, a faltering of the tongue, and distortion of the mouth; and though he partially recovers, he ever after trails the limb. The first excitement of intoxication is delirium; the succeed-

chus colitur) vino repletus portuque obrutus, curru ab Hagha Delfos veheretur, in sinu fratris etiam ebriosi decumbens, supraque dorsum jacens sterteret, ita ut caeteri omnes una in curru existentes ac ebrii ipsum profundo dormire putabant, licet ad interrogata non responderet, nec motu illi citatiore expergisceretur. Vehebatur autem celeriori cursu, laxis equorum habenis ab auriga, cujusmodi homines tunc plerumque etiam ebrii sunt, et sicut mutus ad domum perveniens, et ad eam vix allatus, in stertore permansit, ac subito convulsus periit, antequàm ego et Cornelius Heydius, collega meus acciti, ad eundem pervenissemus, quem mortuum deprehendimus. Vino igitur repletus stertore suffocatus est, quanquam crediderim vectionem illam celerem, ad mortem juvisse subitaneam, cum ita dorso incumbens jactaretur.

Idem evenit cuidam Aurigae Alchmariano, *Joanni Brant*, qui cum ebrius esset, et currum (ab Alchmaria Harlemum proficiscens) regere non posset, eundem sic ebrium in partem currus posteriorem abjecerunt, et alius currum rexit. Verum cum Harlemum appulissent, aurigam supra dorsum jacentem mortuum invenirunt, quem tamen antea stertentem audiverunt. Si vero praesentes utrumque neglectim non habuissent, et in latus volutassent, forte uterque in vomitum incidissent, nec ita subito extincti fuissent. Prior autem antequam in curru suffocaretur, alvum reddiderat, se ignorante ac seipsum confœdaverat: utrumque ex violentia mortis praeoccupantis, haesito.

Those who are poisoned by opium die apoplectic, as also those who die from the excessive use of tobacco, or any other narcotic.—" Two Silesians, brothers, having laid a wager on a subject, (as idle as that of the two boys about sneezing,) viz. which should smoke the greatest number of pipes of tobacco; they both dropped down apoplectic, and died; the one after the 17th, the other after the 18th pipe.

Nota est historia duorum fratruum Silesiorum, qui, cum se provocassent ad fumum tabbacci hauriendum, praemio proposito illi, qui diutius perdurasset, ambo perierunt apoplectici, primus ad decimam septimam tabacci fistulam, alter ad decimam octavam.

Those who die of opium, die apoplectic; examples of which to be found in the Medical Essays of Edinburgh, and in Sauvages.

Stupor mortalis ab assumpto Opio.—Cum nobilis quida podagricus, summis cruciatibus affligeretur, nosque medici illi adessemus, insciis nobis, empiricus impostor, opium illi propinavit, quo sumpto, cum mox ea nocte dormiret, adeo valido sopore pressus, ut et sterteret, gavisa primum uxor, quod de dolore non amplius conquereretur, mox vera eùm totum stupidum observans, qui et impulsus, non e somno illo profundo excitabatur, nos excitavit, quem accedentes, in agone mortis, summe calentem, et sudore frigido interim madentem, deprehendimus, sicque extinctus est.—*Platori Ob.* p. 16.

ing stupor is apoplexy of a shorter duration ; and the tremors which follow are a slight but universal palsy.

The Apoplexia Temulenta is imperfect only from want of predisposition, and temporary because the excitement soon expires. Where the true apoplectic stroke takes place, all incitements naturally tending to hurry the circulation co-operate at once, and the very scene, and the early feelings of oppression, might warn the person of his danger.—The sufferer is usually in the prime of life, or little past it*, of a strong and athletic form, a full habit, a ruddy countenance, of powerful appetites, accustomed to the pleasures of the table, and given to wine. He is seated at a feast, in rooms crowded with company and servants; the lights, the noise and confusion, the vociferous conversation, are oppressive to all but those who are accustomed to such a scene, and would produce, independent of any higher excitements, headache from hurried circulation: close pent up in such a circle, he begins to indulge in high seasoned dishes, and each service is accompanied with brimming bumpers of generous wines, dangerous at any time, and now poured down without reflection, without stint or measure. To this scene succeed the vociferation of toasts, the contention and ardour of conversation; bumpers are still poured down upon a distended stomach, which, by its expanded state, exposes a wide surface to the operation of the excitement; which, both by the nature of the exciting powers, and the contentious and noisy scene of this indulgence, is particularly determined to the head. The person feels, at last, his pulses throbbing, his eyes dazzled, and his senses in confusion ; his neckcloth and clothes begin to be oppressive ; he feels the torpor grow upon him ; he draws his breath with difficulty; and, with an inflamed visage and confused head, he rises to escape from the heat and oppression: he drops back upon his chair; tries to rise again, and falls sidelong from his seat in a state of stupor: his extremities are cold; his limbs relaxed ; his pulse slow and heavy; his face purpled with congestion of blood ; his breathing stertorous, *i. e.* slow and oppressed, and bursting with interrupted and noisy explosions from the lips and nostrils. This state being mistaken for intoxication, (as who can distinguish it,) he is dragged away by servants, and rolled into bed; his pillows are disordered; his head lies low, and his neck is distorted; his breathing, naturally difficult, is half suppressed by the posture in which he lies: he snores loud and deep, and in the morning is found in

* Apoplexiae fiunt maxime a quadragesimo ad sexagesimum aetatis annum.—*Hippocrates, lib.* ii. *De Morbo Attonito.*

a state of irrecoverable stupor; if he is at all capable of being roused, he only stares, but cannot speak: his mouth is covered with foam; his face distorted; his limbs quite relaxed; the pupil of the eye dilated: he groans; his extremities become gradually colder; he passes his urine and faeces involuntarily; and dies often in forty-eight hours.

If I have in the cases which I have just narrated, or in this general view, represented truly the nature of this arterial impulse, how impetuous the rushing of the blood towards the head, and how visible the signs of it, you may easily imagine how much a physician, who really understands the momentous and perilous condition of the patient, will be alarmed lest the organization of the brain should suddenly give way: lest some more delicate vessels should burst, and the patient be struck, perhaps in the very flower of his age, with irrecoverable palsy. To prevent the volume of blood, driven so impetuously through the brain, from destroying its structure, he instantly sets the patient upright, and bloods him profusely from the jugulars, and is sensible that the pulse rises as the blood flows: often the patient, in the moment of bleeding, opens his eyes, stares, breathes more freely, and begins to move his limbs; the pulse continues to rise in strength and become more frequent as the blood flows: in the evening he again draws away more blood. He thus saves the organ from utter ruin, and does not fear to repeat his bleedings, till the senses are restored, and the pulse, from slow, full, and throbbing, becomes light, frequent, and soft; and he thus, by profuse bleedings, prevents debility and palsy.

While I advise that sudden depletion which the occasion plainly requires, I will not involve myself in polemical discussions, but represent to you plainly the approved practice of the most celebrated men of all ages. And I will venture also to warn you against giving ear to the enthusiasm of mere metaphysical physicians, who neither know, nor care to know, the structure and mechanism of the body; who talk of exhausted excitability or of disordered sensorial powers, without acknowledging the physical disorder by which the sensorial power is injured. I will also remind you, that such enthusiasts there have been in all ages, whose theories have suspended the opinion of the profession for a time, which yet, has uniformly returned to that practice which sense and nature dictate. Those of the present day who decry bleeding should be abashed were they told how expressly they are repeating the insipid declamations of the 16th century, "prétendant que c'est un abus de saigner dans toutes sortes de maladies, est que c'ést égorger un malade," &c*. "There are now (says Dionis) and have been in all ages, carpers against this important remedy; men who,

* Dionis.

to make themselves a name, declaim against bleeding" *. Such men arise from time to time: Among others, one appeared about twenty-five years ago in this city, whose efforts, like those of other inventors, served but to destroy prejudices and prove the usefulness of bleeding. His name was Demascene, a good looking man, of an open countenance, and well dressed in the character of a physician, and abundantly impudent. He began with condemning bleeding, affirming, that " to bleed was to commit murder, robbing the person of blood, the very treasure of life: and, next, he explained how the moon presided over human bodies; that by its phases were we to judge of diseases; that by giving his opiates, antidotes, and elixirs, at the just period of the moon, he cured with equal success all kinds of diseases." These were the new principles which he recounted in a printed book. A declaimer such as this could never want admirers, since novelty will ever have its followers, especially among those of higher rank; but his successes being but ill proportioned to his boasting, and the King (whom he had haunted at his public dinners,) and the Queen (whom he had constantly beset at her tea drinkings) being but too well informed of both the ignorance and impudence of his pretensions, gave orders that he should be dismissed the court; a commission so gratifying to those who procured it, that the command was executed in quite a royal manner: " Two Sheriff Officers took him very quietly one morning along, to the distance of three miles, from St Germains; and having privately escorted him so far on his way, gave him, on leaving him, their best advice, never to be found within even that distance of the court, for that the King had given orders that next time they catched him they should escort him to the Galleys.†"

* Il s'éleve de tems en tems des antagonistes de la saignée, qui pour paroître singuliers déclament contr'elle. Il vint à la Cour il y a vingt-cinq ans un certain M***.

† Je finis l'article de la saignée par l'histoire d'un nommé Damascéne qui vint à la Cour en l'année 1669. Elle vous fera voir que de tous tems il s'est élevé des gens qui ont attaqué ce grand remede, et que tous les efforts qu'on a fait pour le detruire n'ont servi qu'à en faire connoître l'utilité et la nécessité. Ce Damascéne étoit un homme bien fait, de belle physionomie, vêtu très-proprement en Médecin; avec ce grand extérieur il parloit bien, et étoit très-hardi. Il débuta par condamner la merveilles qu'il avoit faites; il suivoit la Reine à sa collation dans le jardin du Boulaingrin où il se faisoit écouter comme s'il eut été un oracle. Un Garçon Apoticaire de M. Stuart y étant un jour, prit la parole, et dit à la Reine qu'il ne ne pouvoit pas souffrir que ce Charlatan lui en imposât; que c'étoit un bâteleur et un ignorant, qu'il l'avoit vû monter sur le Théâtre à Rennes et à Nantes, et qu'il ne connoissoit aucune des plantes dont il parloit: et pour le prouver, il entra dans un petit bois qui étoit proche, il en cueillit sept ou huit qu'il apporta devant la Reine, et que Damascéne ne

Be assured that I am incapable of seeking thus for authorities in ancient or modern times for any practice, of the propriety of which I have not the most sincere conviction : But I feel that by persuading you, I may be a means of saving innumerable lives. I have seen but too often that there is but a moment betwixt danger and destruction. " Such declaimers against bleeding we must (says Dionis) learn to endure, but a true surgeon will follow his own convictions. Bleeding ever has and ever will be practised*." " In all ages (says Hoffman) bleeding has been approved as being, in apoplexy, a useful and most natural remedy ; one which admits of no delay ; which should be used in the first moment of the disease†."

The celebrated Walther bleeds with a fury, with which I really cannot wish to inspire you, but which I like to mention, because it bespeaks his strong conviction, not merely of this remedy being necessary during the time of high arterial impulse, to save the organ from danger, but even in the state of pure veinous congestion, to accomplish the recovery of those who are drowned or suffocated. In those who are drowned or strangled, he opens not only the external but the great internal jugular vein, and not only the veins of one side, but of both : he opens at once all the veins of the neck, all the jugulars external and internal ; and, while fomenting the neck with tepid water, he strokes the veins down to work out the coagulated blood.‡ Nay, he requires that, in addition to these, to the four jugular veins, every visible or practicable branch of every smaller vein should be opened, especially the angle of the great fascial vein, where it crosses the jaw, and

pût nommer. Il ne laissa pas que d'avoir beaucoup de sectateurs, parce quil y a bien des gens qui donnent dans la nouveauté, et plus à la Cour qu'ailleurs : mais la suite n'ayant pas répondu à ses promesses sur plusieurs malades qui se mirent entre ses mains, et le Roy ayant connu qu'il n'y avoit que de l'arrogance et de l'effronterie dans tout son procédé, donna ordre qu'on le chassât de la Cour après quatre mois de séjour qu'il y avoit fait. Deux Gardes de la Prevôté le prirent un matin et le conduisirent à une lieue de St. Germain, et là en le quittant ils lui dirent que le Roy lui defendoit d'y revenir jamais sur peine de Galeres.

* C'est au véritable Chirurgien à aller toujours son chemin, il faut qu'il laisse crier ceux qui déclament contre la saignée : ils ont beau s'échauffer on a toujours saigné et on saignera toujours—*Dionis.*

† Abdomin aevo ceu efficax aestimatum, et ab ipsa natura comprobatum remedium est in sanguinius missione, mox in principio mali, sine mora instituta.—HOFFMAN, sect. ii. Thesis Therapeuticae.

‡ Ad nostros conatus autem bono felicique eventu coronandos nobis vena jugularis externa et interna in unoque latere colli secauda est ; tuncque quatuor aperturas per quas abundans cerebrumque premens sanguis educi potest, habemus.——*Walther*, § 43.

the ocular veins in the inner canthus of each eye. Our great surgeon, Wiseman, with less extravagance, but as deep a persuasion of the necessity of very copious bleeding in diseases of the brain, tries to impress it on the minds of his readers, by an anecdote really interesting. He had bled a gentleman, who had received an injury of the head, very often, and he knew well, without taking notice of their rashness, the friends, and even his own assistant, "disliked his so often letting him blood, and were wont abusively to say, *now you shall see our master let him blood again.*" "They concluded (says Wiseman,) that I should be the death of the patient. However, I resolved to blood him once more, and no more." In this final bleeding, Wiseman, after using first a stone porringer, took, when it was full, a pewter one, and pressed it close to the neck in order to compress the vein: It thus happened, that a small hole, which had been melted in the bottom of the porringer, was concealed, the blood ran not merely into the porringer, but through it down his neck, and into the bed unperceived. He left the porringer in his assistant's hands, and retired a little way, affecting to make right the compress and bandage, and he looked sidelong at his patient's face, resolved to blood him till he saw his countenance change. He did observe it change; and thought, that for so full a stream he bled long, and upon stepping up to him, and finding the bed so bloody, he concluded that he had overdone this one bleeding; but next day, when he knew not what to hope for, he found him well in his senses, and discoursing soberly.*

Celsus, aware of the mortal nature of this disease, puts the whole force of the cure, when it is practicable, on this one remedy. His chapter is but a sentence, but it is perfectly decisive: "The apoplectic, (says Celsus,) those who have all the body relaxed, are suddenly cut off; if they survive, they live long; but it is only to drag out a miserable existence, and with the memory altogether ruined. In such deadly relaxation of all the members, bleeding, or kills or cures: all other means seldom restore health, but delay death; the life thus preserved is not enviable. If after bleeding, the reason and voluntary motion do not return, there is no room for hope; if they do return, the patient may be restored to health."†

* Wiseman's Surgery, Vol. 2d, page 131.

† Solent autem, qui per omnia membra vehementer resoluti sunt, celeriter rapi, ac si correpti non sunt, diutius quidem vivunt; sed raro tamen ad sanitatem perveniunt; et plerumque miserum spiritum trahunt, memoria quoque amissa.

Si omnia membra vehementer resoluta sunt, sanguinis detractio vel occidit, vel liberat. Aliud cura-

Such is my opinion of the importance of this remedy, that I reckon it a duty to report these opinions and facts: But no part of the treatment of a patient lying in this oppressed condition, not even his posture is unimportant: Next to saving the organ by lessening the volume and impulse of blood, we are to consider, how to moderate its impulse towards the head. Too generally the patient is permitted to lie in those distorted suffocating postures, into which a paralysed body must decline, the head falling from the pillow, and the shoulders sinking deeper in the bed. The patient while he is suffocated with cloaths, and oppressed by the crowd of friends and attendants, is tormented with volatile salts; warm wine is poured down; opiates and emetics are given; the head is blistered; every thing is done that might excite to a farther accumulation of blood. Do in every thing the reverse of this. Raise your patient into a sitting or reclining posture; have him supported behind; let his legs hang over the side of the bed; bleed him from a large orifice in one or both jugulars; expose him, especially if the weather be sultry, to a stream of cool air by opening the windows and door of the chamber:* sprinkle his face with cold water; apply cold vinegar and water, with a large sponge, over his whole head; dash cold water upon his head and breast; give cool oxymell or honey and vinegar diluted with water for drink. Bleed him while the pulse rises, or until his face change, and if the stertorous breathing relax, if the pulse become frequent and soft, if he swallow more freely, if his groans seem less oppressed, if he raises his eye-lids at last, and appears to know his friends, if he begins to shudder as if feeling the cold, and to move his limbs, you are going to save your patient.

tionis genus vix unquam sanitatem restituit; saepe mortem tantum differt: vitam interim infestat. Post sanguinis missionem, si non reddit et motus et mens, nihil spei superest: si redit, sanitas quoque prospicitur. —— *Celsus*, p. 129.

* In the southern climates of France and Italy, apoplexies are at times, from intense heat, as epidemic as fevers, and more melancholy and alarming. The apoplexy seems in particular seasons to have seized all ranks of people.—" Cujus equidem funesti morbi eventus adeo frequentes erant, ut horrorem mortis, cervicibus humanis, singulo fere momento impendentis, universaliter incuterent. Epidemice hujus apoplexiae causa peti merito poterit ab insueta aeris intemperie; aestas, anno 1693, erat adeo exurens ut squalore et siccitate fere omnia consumi viderentur." Baglieu, next enumerates the colds and snows of a most extraordinary winter, the heat of the succeeding spring, the drought of summer, (when during five months there fell not one drop of rain in Italy;) the horrors war, the thousands of slain that lay unburied, the visitation of earthquakes, and the melancholy that prevailed in all men's minds from these long distresses, and manifold calamities and visitations, when more than ten cities were buried by earthquakes.

When your patient raises his eyes, and turns his head round, observes the bye-standers, and muttering and faultering, begins to speak; when after looking wildly round him, he at last entirely recovers, and knows where he is, do not lay him down again to suffocate among his bed-cloaths: nor do not imagine, because he seems recovered, that all is well and safe; for apoplexy is a disease founded on predisposition, and sure to return, from the first dangers of which he is only relieved: nor do not allow him to lay himself with his head low among soft pillows, and fall asleep; this would be helping him to the brink, and then letting him fall down the precipice again, for sleep is part of the disease. Sleep is dangerous; opium is poison; and I am persuaded that whenever, having survived the first shock without injury to the organ, the patient is struck a second time with apoplexy and irremediable palsy, there is something in the mode of treatment to blame. If, while you are still in the house, you suffer your patient to go to sleep, to indulge that propensity which the disease creates, you will soon be sensible of your error: the slow full pulse, the stertorous breathing, the deep stupor will return. The numbers who going to bed heated, or perhaps flushed, with wine, and who, towards morning, after a long oppressive sleep, are struck with palsy, shows how dangerous a state of the system sleep is to the apoplectic. Keep your patient awake: keep him cool, and fresh, with cool drinks, a pleasant and refreshing stream of air; have him laid on the surface of a firm mattress bed, and at the utmost only in a recumbent posture, not laid along: and when he is to sleep, bolster him high with pillows; sit by him, and watch him, and continue feeling his pulse; and when the snoring and the slow oppressed pulse return, stir and rouse him gently, as you would one who were in danger of falling into stupor, and perishing from cold; and, upon the slightest appearance of decided stupor or turgescence of the face, of headache or confusion, ringing in the ears, or throbbing of the pulse, spare not the lancet, but bleed him again. Let the necessary bleedings be followed by the most drastic purges, especially of Calomell conjoined with antimony, to purge and sicken at once, which wonderfully abates the high arterial action, but do not give the antimony in such doses as to excite vomiting: Give stimulant glysters if required; keep the feet warm with heated bricks; the head moist with cold applications; the body cool with a stream of fresh air; and the movements of the system temperate by giving weak acidulated drinks.

Opiates, and sudorifics which are disguised opiates, qualified with some emetic, are very destructive; for, though they do no instant harm, they increase the predisposition to disease. Blisters are doubtful in their effects: if ever they are to be

used, it is in that chronic apoplexy which I shall presently describe. Emetics are eminently dangerous by hurrying, in a particular manner, the circulation within the head.* There is not, perhaps, in all the books of Morgagni, a case more deeply interesting and instructive than that of Antonio Tita who died from the rashness and ignorance of his physicians committing a fault which is daily fatal, prescribing an emetic: a trivial prescription, God knows: Yet trivial as it seems, from the frequent repetition of it, from it being the favourite prescription of every man who knows not what else to do, it is often followed by the most fatal consequences. "An epidemic disease of the head prevailed in Padua: the weather was hot; and Antonio, now seventy-three years of age, had complained for some time of fullness in his head. On the 4th of May, when the Sun was unusually hot, having spent the whole day in the open air, he suddenly, while sitting at supper, cried out that he was seized with some violent disease; and while he spoke, his tongue failed him, and his limbs became paralytic. Morgagni, being called, ran to his assistance; found his colour natural, his senses perfect, his faculties entire, his respiration free: he had no disorder in his head, but an inclination to sleep. Morgagni sent one to call a surgeon, another to call a priest, lest Tita should presently have a more decided, perhaps a fatal stroke. He had him bled, gave a glyster and retired, as he knew that his ordinary physicians were called; but forbade hartshorn to be applied to his nostrils, lest it should accelerate, in a dangerous degree, the circulation of the blood in the brain. When his physicians arrived, they prescribed an emetic; and soon after its operation, the patient was struck a second time with a paroxysm so much more violent than the first, that his speech entirely failed; a stupor began; and his body was agitated withuniversal convulsive struggles, in which he died.†"

"The effusion of blood was found in the right ventricle of the brain; but it was very fluid, and had in some degree pervaded all the ventricles." The plexus choroides it is most likely had given way. Example is so much more prevailing than the most rational precepts, that you will I doubt not remember this anecdote always.

* Van Swieton (p. 83.) strongly disapproves of gilded powders, as they were called, balsams, cordials, and various stimulant drugs, which it would appear in those days, and in that courtly city, fine gentlemen had carried to feasts, as ladies, at an assembly or concert, are provided with eau de luce. As these were all stimulants, Hofiman condemns them indiscriminately, and in the same place condemns emetics.

† Related in Letter 3d, sect. 11.

"I have often (says Bursarius) when emetics were to my great sorrow prescribed by others, seen a hemipleghia, or slight and partial apoplexy, changed straightway into deep and universal apoplexy; or a deep and complete apoplexy, become fatal in a few hours."* Whether there is any truth in the common observation of blisters operating as anodynes, and procuring sleep, and whether they do so by causing a degree of congestion in the head, I will not pretend to decide; but I cannot conceal from you that practical writers dissapprove of their being used in the high, active, and sanguineous apoplexy. "Tutius a cantharidibus in sanguinea ut dicunt apoplexia abstinemus," says Tissot; and he supports his assertion with cases where the application of blisters seemed to have proved fatal, though I rather think those deaths accidental.† The patient should also shun the warm bath; for, often being immersed in a hot or tepid bath, he comes out of it with his veins swollen, his face inflated, his breathing short, his head giddy, and his limbs tottering; so that were he detained a few minutes longer in the bath, he would drop down apoplectic.

* Non semel meis ipsis vidi oculis datum ab aliis emeticum, et vehementer dolui, hemipligiam vel levem et particularem apoplexiam illico in validam et universalem transiisse; fortem vero atque exquisitam intra paucas horas in mortem.—*Bursarius*, § 131.

Emetics or vomiting in apoplexy is a rough and dangerous prescription; and I am persuaded that no precautions can make it safe, not even those bleedings which must always be premised. Sydenham imagined he could prevent ill effects by previous bleeding; but even his precaution proves how conscious he was of the danger. "Take away twelve ounces of blood immediately from the arm, and afterwards eight from the jugular vein, and presently after exhibit a vomit of an ounce and a half or two ounces of the antimonial wine."—*Sydenham.*

Et in primis nonnullis signis vitae inventis, ad majorem irritationem infelici non emetica propinaremus. Nam eo ipso non adjuvamus sed jaculamus.—*Walther.*

† Virum vidi quem vesicatorium emplastrum cervici appositum, ut canthariosum ad dentes decubitum profligaret, in soporem conjecit vix post viginti quatuor horas excutiendum. Minuitur periculum sublata plethora; anue tollitur integro? Certe, minuta utcunque plethora, remanet in plethoricis idiossynacrasia quae facillime impetum et phlegosion denuo excitat Peripneumoniae et pleuritides, quo tempore sanus credebatur aeger, ex minimo stimulo acerbo, subito, majori cum periculo recrudescunt. Vidi, anno 1757, in alia urbe, faeminam sexigenariam, sanguineam, polysarcam, apoplexia arreptam; post venae sectionem, enemata, purgantia, aliaque haud prorsus imperite gesta, cervici, sub eadem pharmacopolae tutela, aponebantur cantharides. Vix, nisi spectator, credidissem, totius inde dorsi phlogosis, angina, acuta pelvis, auctus sopor jam jam discedens, saevi dolores, crudelis anxietas, indesinens jactatio, horrenda mors. Tutius erga cantharidibus in sanguinea ut dicunt apolexia abstinemus; et quando revellere volui, post molles patus semen sinapi fermento interspersum suris applicari jussi; et laetus aliquoties vidi prout tumebant crura liberari caput.—*Tissot*, p. 24.

But bleeding, though it prevents present danger, produces no permanent effect; it alters no secretion, effects no natural action, produces no favourable changes on the bowels or skin, perhaps it but leaves the patient more prone to relapse. It is upon these organs, the bowels and skin, and through these, on the fullness and action of of the sanguiferous system, that we are to reform the temperament of the body: you must watch your patient carefully for weeks, and diet him for life. The patient who has been struck with apoplexy, or threatened with palsy, should be much purged with medicines, or with mineral waters; should go a pleasant journey, or seek a country residence; should avoid the air of a city or the heat of public assemblies: he should shun all strong mental exertions, all deep studies, all passionate altercations: he should be careful to preserve a serene and placid temper of mind, and sacrifice interests, pleasures, or even duties, to health; and when he thinks himself able to return to his occupations or duties, should resume them slowly: his diet should be almost entirely vegetable, since a vegetable diet is sufficiently nourishing for all the purposes of health: he should allow himself no indulgence at table nor in bed; should take no supper; go to bed betimes; sleep cool on a hard and firm matress, and with his head pillowed high; and though he may have fire in an adjoining chamber, must have none in his room: his exercise should be equable and gentle, that of a carriage is the safest and best: he should avoid the heat of the sun, especially in summer and autumn: he should wear flannel, and bathe the head in cold water; but cold bathing can seldom be allowed: his whole life should be correct, regular, and temperate; and he will feel himself well and safe, his senses lively, and his limbs strong and nimble, only while he keeps the stomach clear, the bowels active, the skin perspirable and the body cool. This spare diet and cleanly living, these early hours, morning exercises, and fresh air, produce a renovation of health and strength; and the pampered and self indulgent patient who engages with reluctance in this active manner of life, and is difficultly inured to it, finds it at last his happiest state, and is conscious of an alacrity of spirits, a clearness of intellects, and vigour of health, which he would not exchange for all those gross enjoyments, or that voluptuous languor in which he was wont to indulge.*

* "Longeva oh quantum gens humana, si firme crederet, hanc viribus optime consulere, diaetam quae morbo magis adversatur."—*Tissot*, p. 25.

Of all the dismal scenes proceeding from sudden impulse of blood towards the head, that of child-bed labour is the most afflicting, since, you watch through a long and gloomy night, over one labouring under the most dreadful of all convulsions, and becoming every moment more and more apoplectic: without perhaps the means of giving assistance, you stand responsible for the event.

The womb is a part superadded to the general system of the circulation: its veins or sinuses, as they are called, are capacious in a degree inconceivable to those who are not practised in the arts of injecting and dissecting the uterine system: They gradually expand during pregnancy, till there is accumulated in them a mass of blood equal almost to that of all the other abdominal viscera; in proportion as the womb contracts in labour, this volume of blood is by compression of these veins returned into thesystem. A phenomenon inseparable from labour, and more especially from severe or protracted labour, is, that each pain, while it rouses to great exertions, ends in a state of stupor; not because excitability is exhausted, for if it were, how could it be restored before the returning pain; but because the uterus is compressed, every limb is in convulsive action, and the breath is restrained till that impeded state of circulation is dangerous: at each pain, the face is swelled, and the eyes turgid with blood; and the patient subsides at each interval until roused again, by the succeeding pain, into a state of stupor, different from sleep, especially dangerous when, by the abuse of opium and spirits, it is urged on towards the true apoplectic state: in this condition of the brain, the patient is disposed to apoplexy and convulsion.

When in a young, strong, and plethoric woman, the irritation of a first labour is severe and sudden, the face flushed, the struggles violent, and the screams delirious; she soon falls into a state of stupor; and the ensuing labour-pains begin to be accompanied with covulsion. In place of being roused by the return of each labour-pain, the jaws clench, the neck stiffens, the whole body becomes rigid; she is sensible that something terrible is coming upon her; she struggles and shrieks; her eye, turned upwards, is fixed and staring: she becomes mute with universal convulsion, all the limbs are rigid, the face is distorted, the grasp she has taken cannot be disengaged: the arms and chest are convulsed, and the blood is so injected into the head, that the face is purple, the lips black and protruded, the tongue is thrust between the teeth, and mangled, while bloody foam issues from the mouth: the labour-pains cease, or nothing but the slightest appearance of bearing down can be perceived.

Now, the convulsion being fully formed, takes place of the labour; at each return of pain, the neck stiffens, the eye turns up, and the whole body trembles with the convulsion, and at each returning fit, the face is more and more suffused, and the stupor deeper. No man can witness these struggles, and this injection of the head with blood, without being conscious of their extreme danger: In the few that recover, the neck and face is green with extravasation; and well may the delicate substance of the brain suffer from a like cause: If the patient survive, it is by a long stupor, attended with stertorous breathing, and terminating gradually in a placid sleep, but followed by deep seated headaches and long weakness; more commonly the patient dies: every moment, the increasing swelling of the tongue, protrusion of the lips, and blackness of the face demonstrates the effects of each struggle in driving the blood into the head, and the stupor becomes deep and deadly. The patient struggles, the body is stiffened, the hands are clenched, and the face distorted during the paroxysm; but during all the interval, she lies still, oppressed, snoring, so that she may be heard in the adjoining chambers, and in a state of the deepest stupor. The tongue, bleeding from the unavoidable injuries, is so swelled as to fill up all the mouth. The eyes are protruded; the whole face, lips, neck, and throat tumid and purple with blood, not merely accumulated but extravasated from every smaller vein. She suffers thirty or forty paroxysms of epilepsy during the night, and by the morning, though the epilepsy has ceased, and the patient delivered, the stupor continues, and she dies in a deep state of apoplexy. If such a patient is to be saved, it can only be by profuse bleeding, which I have sometimes repeated three times during a long and dismal night, and by putting an end, at all events, to the labour and the convulsive struggles by delivering the child.

I have been careful to keep this view of the apoplectic state clear and simple, unperplexed with those subtleties and unmeaning distinctions which nosologists have invented; yet am I conscious that Nosology, i. e. the distinction of the various degrees and species of this disease, is a kind of knowledge which I must not withhold from you. Correct descriptions of diseases, and the evidences of corresponding states of the brain, taken from morbid anatomy, have a natural alliance: were I to leave you uninformed of the usual distinctions and characters of these comatose diseases, or did I fail to join with such diagnostics, descriptions of the condition of the organ, I should leave you without one of the best and surest guides to correct practice; your future progress in the study of books would be interrupted by the frequent recurrence of names and distinctions unknown to you; your practice would be unsure

and vaccillating. Whatever my opinions may be, concerning nosology and its usefulness, it is my duty freely to express them, and to teach you on some principle or other, (either nosological or pathological), how to distinguish the various forms and degrees of stupor.

Nosology *, if meant for any good purpose or worthy of the labour bestowed on it, should certainly be so ordered as to facilitate at once the discrimination and the cure of diseases; it is a practical study, or it is nothing; it should look back to the cause, and forwards to the cure. But it has been the great and avowed princi-

* Even on the very threshold Nosologists stumble upon the first definition, the simple definition of disease; and much and long have they doubted, whether disease be a *privation*, or a *permanent effect*. "Affectionis alicujus impressum vestigium, scilicet qualitas quaedam in corpore nostro permanens." Most learnedly hath this important question been disputed on either side; one sect declaring, "that disease is nothing in all the world but a privation of health:" "That it is nothing but an evil, and that evil is merely the privation of good:" "That disease is in its essence but want of power of action; and power and privation are directly opposed to each other." But it is on the other hand affirmed, That "disease is a positive state or diathesis of the organs." "That this positive state has a power of disordering and corrupting the body:" "That disease is not a mere privation of health, but something *contrary* to health."* This is a species of scholarship admirably ridiculed in the garrulity of the simple Pollonius, whose logic is all of the same cast, especially when he investigates the cause of madness, which he does as profoundly as Gregorius Horstius, saying,

> "Mad, let us grant him then:—and now remains,
> That we find out the cause of this effect;
> Or rather say, the cause of this *defect*;
> For this *effect defective*, comes by cause."

* *An morbus sit Ens privativum?—Affirmabitur quaestio sequentibus rationibus:*

1. Quia morbus nihil aliud est quàm absentia sanitatis in subjecto habili:

2. Quia morbus est malum quoddam: *atqui* malum cum privatione, quemadmodum bonum cum actu convertitur:

3. Quia morbi essentia consistit in impotentia ad agendum: *atqui* potentia et impotentia tanquam habitus et privatio sibi invicem opponuntur.

Contra negativam confirmabit aliquis hoc modo:

1. Quia morbus est positiva partium διάθεσις, p. n.

2. Quia vim alterandi corrumpendique corpus nostrum obtinet.

3. Quia sanitati non privativè, sed contrariè opponitur.

Pro decisione quaestionis notandum, quod secundum *Thomam*, aliosque *Scholasticos* Malum aliud in sese tale sit, aliud verò respectu alterius. Etsi verò omne malum boni privationem importet, quia utrumq; dicit imperfectionem et defectum, non tamen sequitur, illud quod alteri malum est, in sese quoque privationem esse. Quâ ratione tenebrae non aliter quàm per absentiam luminis describi possunt, quia in sese consideratae privationem constituunt: at calor aquae dicit quidem privationem, non tamen in se, sed respectu illius subjecti, cui secundùm naturam frigus convenit.

ciple of the nosologist to decline all speculation; to disavow all knowledge of causes; to let no expression escape him which might lead his reader to suspect him of being acquainted with the condition of the organ, or the state of the system, which produces any given disease. * In all his definitions, the character of usefulness is sacrificed to that of accuracy; no expression is admitted, however illustrative of the disease, which may compromise his reputation or involve him in debate: no questionable theory, no reference to pathology is allowed: his own reputation is uniformly preferred to the improvement of his science: his art is mere logic; with physics it has no concern: his distinctions may be relished in the schools, but are useless in practice. He is chiefly curious about the due marshalling of the orders, genera, and species of disease, so that they may not encounter or perplex one another, about arrangements which import nothing, and accuracy which is never to be useful; he excludes philosophy, that his logic may be pure and unquestionable, and keeps clear of the slightest reference to the probable causes of disease, as if it were derogatory from the dignity of strict scholastic definition, (quod est peccare in regulas logices). Is it possible to approve, or creditable to follow, principles so narrow, and so plainly selfish?

The nosologist is as much mistaken in the analogies on which he founds his science, as in the method which should be pursued to make it useful. He imagines that he follows the plan of the natural historian, without adverting to an absurdity entirely peculiar to his own. The naturalist defines a substance which he sees, feels, and handles, by qualities obvious to his senses: the nosologist records signs and symptoms, but of what condition of the system, of what state of the organ they are signs, he professes to be entirely ignorant. The naturalist would make himself but ill understood, who were to define a plant or a metal without indicating its properties and affinities, without applying the description to some material form; or an animal, without reference to its conformation, habits, and powers. But the definition of a disease, is something ludicrously different from that of any material substance; it is a compressed and concentrated description of the signs, importing a certain state of some organ of the body; which state, the nosologist affects not to know, or refuses to name, lest he should be convicted of error, or involved in disputation: his definition is not the description of a substance by its quantities, nor does he infer

* Pecat itaque morbi definitio, quum ingrediuntur ea quae sunt obscura et hypothetica, ut sedes interna et propria, quae sensibus in *viva homine* non potest distingui."——*C. F. Daniel Prolegomenon*

some material existence from the signs which indicate its presence; his definition is a mere enumeration of signs, which he displays so parsimoniously, and arrays so artfully, as to defy you to infer any thing, : the material sign, the state of the part as discovered by dissection, is wanting; and thence his definitions lose all relation to any material existence, and his arrangements all relation to practice.

Ab theoria abstinendum satius esse puto, (says Sauvages,) quae non nisi fortuito, in veram praxin manducere potest."* This is the spirit in which the study of nosology, the great and important, the practical science of arranging and describing diseases, has been pursued. But we shall not suffer ourselves to be restrained by the prejudices, nor circumscribed within the lines and demarcations of the nosologist's province. Pathology suggests useful and practical distinctions; and I am inclined to risk that censure for the sake of usefulness, which the nosologists have avoided, in order to attain a tame unprofitable correctness. I am surely not far wrong in believing that you will find Pathology (imperfect though it be) more useful than Nosology, or, in other terms, Anatomy more subservient than Logic, to the discrimination of diseases; and however injudicious the combination of these two departments may appear, I am contented to subject myself to every kind of criticism, and would rather have you improve by correcting, or attempting to correct, my definitions, and instruct you by irregular but useful descriptions, than remain safe from criticism, by a dull, formal, blameless mediocrity.

The thing which has been attempted,---the enumeration of signs without reasoning on their import, or thinking of the state of the affected organ,---is impossible: In a science where every term and every arrangement becomes a theory, according to the sense in which it is received, to refrain from reasoning, is to refrain from thinking. The disclaiming all knowledge of causes which might have led the nosologist into practical but not unprofitable disputes, has involved him in useless ones. His ingenuity is exerted in a perpetual struggle with the natural course of his own thoughts, and the natural connections of cause and effect. He endeavours so to define the signs and appearances produced by certain states of the body, or of individual organs, as to exclude the slightest intimation of the organ which is affected, or the state of it by which such signs are produced; and, in this unavailing and absurd struggle, the nosologist mutilates or suppresses the most characteristic signs, lest the mention of them should suggest a theory, and changes

* How opposite this to the maxim of Hilderius, which, though conveyed in the abominable form of a pun, is yet very worthy of remembrance, ANATOME CLAVUS EST ET CLAVIS MEDECINAE.

the aspect of every case he describes, in order to deliver it in general terms; nor does he allow himself to dwell, even upon the pathognomonic signs, lest they should present to the imagination of the student some shade of the cause or morbid affection. Thus have nosologists, by disavowing all knowledge of morbid anatomy, and of the internal causes of disease, (which yet we should think were as easily investigated as irregular symptoms, and as easily imbodied in a definition as quickened pulse or oppressed breathing,) excluded themselves from the possibility of attaining to even the elements of a definition.

Glance your eye along the countless divisions and petty distinctions of soporose diseases, and you will find one phenomenon, infinitely perplexing to the nosologist, viz. The irregular blending of Delirium with Torpor! This confounds all his definitions, and defies all attempts at arrangement. Stupor or coma is the disease to be defined; but that stupor, that debility of the senses, is marked in its approach by every sign of quickened circulation and violent excitement; and even the deep stupor is interrupted with fits of delirium! Symptoms so incongruous, arranged side by side, give to the definition of any disease an air of perplexity, though there is only required to make the description, at once consistent and instructive, an occasional and most natural reference to pathology or the state of the affected organ. The first state of the disease is a state of arterial action; the second of veinous congestion: the first is the active, the second the oppressed, state of the circulation within the brain: the delirium and coma are the signs of those stages: but if you will separate those two disordered states of the intellect from their physical causes, like all other natural phenomena thus partially exhibited, they will appear very unintelligible, and the gradual declining of the delirious into the comatose state quite inexplicable.

The nosologist, interdicted by the rules of his science from entering into the consideration of causes, knows not how invariably arterial action is followed by cellular effusion and veinous congestion; how gradually the veinous congestion represses the arterial action which produced it; how gradually the oppressed gains upon the excited state of the circulation; how slowly the states of coma and stupor gain upon the states of excitement and delirium; how imperceptibly and gradually these two states of the intellect are blended together. The period of any disease, whether febrile or not febrile, during which delirium and stupor are mixed, is short and transitory; though the alliance of those two states with each other is most na-

tural, yet the delirium, being confounded with coma, seems an inconsistency, and anomaly, which interrupts the simple description of the disease; it is by enumerating delirium, and stupor, as common symptoms, that the definitions of Lethargy, Typhomania, Caros, and other affections of the brain, appear inconsistent, and unintelligible. If the Delirium of Fever terminates in torpor; if the Coup de Soleil, or sudden impulse of blood into the brain from intense heat of the sun, terminates in raving, vomiting, insensibility, and sudden death; if the Caros or febrile apoplexy, the sudden impetuous impulse of blood into the head, terminates in torpor affecting not merely the faculties, but even the breathing and the pulse, the vital as well as the voluntary motions; if the Inflammation of the Brain in children begins in pain and screaming, and ends in squinting, blindness, palsy of the whole body, and sudden death; what have we to infer, but that coma is that final state of the brain in which all extreme vascular action terminates, either by accumulation of blood in the arteries and veins, or by extravasation of blood or effusion of serum. The diseases, included under the class of Comata, begin universally with violent arterial action, and only end in that state of stupor whence they have their name *.

Are they so defined? By no means. The nosologist, evading all the signs of action, dwells only on that stupor which connects the disease with the class in which it has pleased him to arrange it. In defining apoplexy, the livid face, the inflated features, the throbbing pulse, and all that might characterise the disease as a state of arterial action, is suppressed to make way for the stupor of the senses, and the insensible and relaxed state of the limbs and body. The most interesting and only curable stage is not described: the character is taken solely from that stupor which we can seldom remove; which all writers, from Celsus downwards, have acknowledged to be fatal.

Were I to ransack the volumes of nosology, I should not perhaps find more curious examples of distorted, incorrect, useless, definitions, than those of the diseases of oppressed intellect. Has the nosologist truly avoided hypothesis? By no means: every word is a theory, every arrangement an implied doctrine. Indeed we cannot be restrained from reasoning; according to the terms in which symptoms are explained, or the order in which facts are exposed, must we judge of their import. Sauvages who, in the passage lately quoted, protests that "He will abstain from

* When delirium ends in deep stupor, as when in remittent or intermittent fevers, the apoplectic stupor which often marks that type ends, survives the paroxysm that produced it, or that stupor ends in palsy, the patient is gone. "Si sopor cum paroxysmo non evanescat, aut aeger sit typhomanicus, hemiplecticus, febre inflammatoria detentus, de eo conclamatum est."—*Sauvages.*

theory, since it seldom leads to laudable practice," describes the whole class of impeded, vital, and voluntary motions under the title DEBILITATES; a word which is in itself a theory of wide and destructive range.—*Debilities*! Surely, suspension of the senses may be termed debility; suspension of vision, is, in this sense, debility of the eye; suspension of the loco-motive power, debility of the limbs. But the term so incorrectly used implies only *inability*, impotentia; ("impotentia, as Sauvages describes the class, clare et distincte sentiendi, appetendi, consueta vi artus, organave movendi, nec non imaginandi, vigilandi," &c.) that *inability* referrible to a particular part or organ; that part or organ disabled by some injury; and the point we would ascertain is, by what variety in the action of those vessels by which the organ is nourished, maintained, and supported, in the due performance of its functions, is it now disabled?

An organ or part may be injured by want of action in its vessels. When those arteries, e. g. which support a bone, cease to act, and fail to nourish it, it becomes brittle and breaks. When the same arteries are excited to excessive action, and the bone is inflamed, its organization suffers, it becomes carious, brittle, and breaks. The limb, you may say, if you will, is *debilitated*; I should rather say disabled; the word debility I should reserve for expressing the decline of those vascular actions which are connected with the principle of life: it is plain that the bone may become carious, and the limb disabled, either from a *debilitated* action, and being not duly nourished, or from an *irritated and excessive action*, which destroys its structure.

DEBILITY, then, in whatever sense it is used, whether as a pathological term relating to the living actions of the system, or as declaring a simple fact, viz. that a part is injured, is very faulty, and is most awkwardly substituted for the word INABILITY. Is suspension of the senses (impotentia clare sentiendi appetendi, &c.) debility? Then sleep is debility, blindness is debility, lameness is debility, madness from fracture of the scull, raging and furious madness, (impotentia clare et distincte sentiendi et appetendi) is debility; but such madness, blindness, lameness, are the result of the most intense and ruinous action in the blood-vessels, of the inflamed eye, the injured brain, and the diseased joint.

Every individual definition partakes of the incorrectness of that of the whole order. Thus, the definition of apoplexy is, "Loss of voluntary motion, sleep, more or less oppressive, but with uninterrupted action of the heart and arteries *?"

* Motus voluntarii fere omnes imminuti, cum sopore, plus minus profundo, superstite motu cordis et arteriarum.—*Cullen.*

What is this? If it be a description, it is a very indifferent one, since it conveys no idea of the bloated countenance, the hurried pulse, the headache, or confusion which precede this debility of the senses, and voluntary motions: The first stage is omitted: yet it would be just as correct, to define fever, delirium, with thirst, a furred tongue, and a rapid pulse, without mentioning the trembling which precedes those signs, as to define apoplexy "Loss of sense and voluntary motion," without describing the signs and symptoms that precede, perhaps produce that state. Is this a definition? Then even in the strict and logical sense, half the phenomena, and all the appearances which denote the condition of the system, are omitted: it is called sleep; but, if it be so, it is a kind of sleep, more spoken of by evangelists and prophets, than by nosologists, as in the Scriptures where mention "is made of the generations which have fallen asleep." It is expressed besides, in the definition, that "the pulse and respiration continue:" surely, for the person is still alive! but they are deeply affected, the pulse being slow and heavy, and the respiration oppressed: the distinction here insinuated, betwixt the vital and the voluntary motions, is hypothetical, and untrue; for the same pressure, which affects the reason and senses, affects the voluntary motions, and oppresses the breathing and the pulse.

Caros is another important species among the *Debilitates* of Sauvages: it is characterised by "deep sleep, from which the patient can hardly be roused, but his respiration is notwithstanding quiet and noiseless: It is an acute disease, terminating in a few days, usually distinguished by fever, and redness of the face, with the eyes remaining half open." Another, equally conspicuous species, is Typhomania, which is defined "Sleep, or a semblance of sleep, while the patient is really and continually awake, accompanied with delirium." The Carus Pyrecticus, the Febrile Caros, or slighter Apoplexy, is still more conspicuously at variance with the designation of the class: "It begins with headache and vertigo, continued fever, a flushed face, and rapid and throbbing pulse; it is the disease of adults, of the pampered and intemperate; it is often preceded by sickness, which is rightly attributable to the headache, since it brings with it no foulness of the tongue, nor other mark of a disordered or loaded stomach; it is a disease which requires successive bleedings of the arm and ancle, with emetics interposed. The fever is of the inflammatory type; and often the disease closes with palsy of half the body *." Nay, apoplexy itself, deep incurable apoplexy, is described as a dis-

* Carus Pyrecticus, Apoplexia Minor, Sanguinea Apohnia, &c. "A Cephalalgia et vertigine initium ducit, cum pyrexia acuta, continua, faciei rubore, corporis calore, pulsu frequenti, et forti; hic

ease accompanied with " a florid or empurpled redness of the face, heat, and a full and heavy pulse, as a disease caused by abuse of wine, violent passions, intense heat of climate or season; which, if it is to be cured, is curable only by profuse bleeding *."

Such are the species, ranked under the order DEBILITATES of Sauvages; diseases, bearing every unequivocal mark of high arterial action; while the profuse bleedings, on which alone Sauvages himself depends for the cure, give the lie to that arrangement, which places them under the class of Debilities, and prove the doctrine I have delivered: these affections terminate in debility, *i. e.* in palsy of the whole or of one side of the body only, when the blood vessels of the brain have actually given way under the excessive excitement. Surely fever, delirium, redness of the face, sensibility to light, and a rapid pulse, correspond ill with t e class under which these diseases are arranged? A system abounding with such glaring inconsistencies, in respect to the arrangement of diseases, and with definitions thus speckled and spotted with imperfect unavowed hypothesis, and so deformed with logical inaccuracies, cannot command much respect, nor impose silence or restraint.

Were there not innumerable phenomena in the living body, proving, that there prevails in these diseases, a high excitement in the arterial system of the brain, were there not irrefragable proofs, from dissection, of the vessels giving way under such sudden impulse, I should refrain from embodying, in any definition of the diseases of the head, the facts of pathology or dissection along with the external and obvious symptoms: but even though the attempt were more adventurous and more extravagant, I think it must be useful; I shall, therefore, lay before you a practical SKETCH of the VARIOUS CONDITIONS of the BRAIN, embracing, in short descriptions, the causes,—the symptoms,—and the condition of the organ in each disease.

The more conspicuous morbid states of the brain, as far as I have observed them in practice, or distinguished them in the works of learned authors, may be thus shortly described.

morbus plethoricos, crapulosos, seu intemperantes, adultos gravidus, adorire consuevit; nausea saepe antecedit, quae gravi Cephalalgiae tribuenda est, cum lingua aliunde nitida est, nec ullam suburram in ventriculo designet.

Hic morbus vulgo exiget, plures e brachio et pede phlebotomias, interposita magna dosi Tartari emetici; febris ad synocham attinet; et morbus Hemiplegia quandoque solvitur." &c.—Sauvages.

* " Comitatur initio color faciei floridus, aut atroruber; calor, pulsus plenus. Praecedunt plerumque crapulae, indigestiones, vini abusus, pathemata gravia, insolatio, &c.: curatio a *phlebotomiis* largis, ordiri debet."—Sauvages. Such are the genera and species of this order DEBILITATES.

CAROS, the lesser apoplexy, or febrile apoplexy, is, apoplexy in its first stage, or slightest degree *. It is the disease of men just past the prime of life; of men predisposed by natural strength of constitution, by peculiarity of form, by intemperance and frequent indulgence, or by a native and hereditary tendency: sometimes, from a long tract of weather extremely hot and suffocating, the disease becomes in some degree epidemic.

Caros, or apoplexia febrilis, begins with a high and throbbing pulse, which you would pronounce febrile, were it preceded by shivering, or accompanied with heat, thirst, or foulness of the tongue; there is a manifestly accelerated action in the arteries of the head, evinced by preceding headaches, a sense of fullness within the head†, ringing of the ears, obscurity of vision, giddiness and confusion of the senses, and throbbing of the temples; so violent that the arterial action is felt by a painful concussion within the head, accompanying each pulsation: often vomiting and hiccup precede the state of insensibility.

The patient falls more or less suddenly into a state of stupor, very different from sleep: it is not exhausted nature recovering by rest; but oppression of the brain, verging towards death: it is a deep oppression, resembling the sleep of intoxication, but during which the patient is really awake; yet not so deep, but that he can be in some degree roused: when shaken, stirred, and called to, he opens his eyes and stares; if longer disturbed, he seems a little to recover his intellect; he sometimes turns away his head, and moves his limbs; sometimes after staring round him, as in stupor, he begins to recollect the scene and persons around him; and after a momentary exertion, when oppressed with questions, he replies with a monosyllable in a groaning voice, and falls down again into a state of stupor. When this torpor increases, he can no longer be at all excited, but lies along motionless; his senses quite obscured, his limbs quite relaxed, his pulse still throbbing, but becoming slower.

The oppression, if not relieved by profuse repeated bleedings, terminates in palsy from rupture of the vessels, or in deep apoplexy, and death, from veinous congestion or cellular effusion into the substance of the brain: But, it is not at first apoplexy,

* "Carus cognoscitur ex somno altissimo, vix excitabili, et respiratione tacitu pacatissima."—*Sauvages.*

"Typhomania est simulatus, aut aparens sopor, cum pervigilio reali; vel sopor levis, e quo aegri facile excitantur, cum delirio comitante."—*Sauvages.*

Apoplexia minor, Apoplexia mitis, Apoplexia levis, stupor, torpor, gravis dormitatio, apohnia Hippocratis.

† The Pressura Coelii Aureliani.

since the vital functions are not affected, the limbs not absolutely relaxed, the faculties not quite obscured, the pulse not sunk below 60 in the minute, nor does it pause nor intermit; the breathing is also without stertor.*

Apoplexy is attended not with different, but deeper signs of oppression, affecting not merely the reason, the senses, and voluntary motions, but the vital functions, the respiration, and the pulse. The gradual decline of the vital functions leads to the final close; for while the senses are obscured, the body relaxed, the breathing stertorous, and the pulse slow and full, the breathing becomes more difficult; the pulse becomes gradually slower and weaker; the stupor deeper; the extremities colder: the sphincters lose their power; the face itself changes to a pallid and greenish hue; and the patient expires.

There are thus two peculiarities in this form or stage of the disease, viz. the suddenness of the affection, so that the attack is denominated an Apoplectic Stroke, and the deep immoveable stupor. Those affected with Carus become, in the progress of the disease, apoplectic; but apoplexy, from the two Greek vocables, apo-plectein, implies merely what is expressed by the Latin names Attoniti, Siderati, that the person is knocked down, felled, planet-struck. Yet apoplexy differs in nothing except in degree, from the lighter apoplexy, Caros; it flows from the same hereditary predisposition, and the same excesses; is preceded by the same feelings of headaches, confusion, and giddiness; it is in a moment excited by the same furious passions, by heat, insolation, &c. The suddenness of the stroke prevents the preliminary symptoms from being marked; but the first stage exhibits the same violence of arterial action; the same redness of countenance tending to lividity; the same protrusion of the lips, dilatation of the nostrils for breath, and staring of the fixed and prominent eye. The senses are in apoplexy entirely obscured, the limbs utterly relaxed and palsied, and the torpor profound and immoveable: There is no stirring of the limbs; no motion of the eyelids; no attempt to speak even in monosyllables; no indication of sense or feeling, even when roused, shaken, stung with nettles, or otherwise tormented: no swallowing even of liquids, unless you set the patient upright, close the nostrils, and pour it down, which is never attempted, (so deep is his insensibility,) without danger of suffocation. Even emetics, which are sometimes imprudently given, seldom produce sensible marks of sickness: the stomach and bowels, if the patient survive, are, from their palsied state, distended with flatus: the breathing is slow, loud, and stertor-

* Somnus longus, profundus, aegre excitabilis; cum facultatum principum, et praesertim imaginationis lesione, sine respirationis detrimento, pacatissime et rarissime respirent.

ous, or alternately interrupted and delivered with a loud burst from the protruded lips and dilated nostrils: the pulse, at first soft and full, grows slow and intermitting; the breathing becomes more stertorous, drawn at longer intervals, and delivered again with louder bursts; all the functions become gradually weaker; the extremities become cold, the pulse weak, and the patient dies.

Apoplexy is thus the extreme case of oppressed brain: a proof that where there is stertor and deep insensibility, all the functions are at once affected. If this state is to be at all relieved, it must be in 24 hours *. Sometimes it terminates in palsy, more frequently in death. Often there is found, upon dissecting the brain, no conspicuous mark of disorder †. The essential and inseparable marks of the apoplectic state, are the brain bursting (upon the cranium being raised in dissection) from its confinement within the scull, bulging in the centres of the hemispheres, and seeming more closely bound down in the direction of the great sinuses: when in the apoplectic state the Dura-Mater is cut, the veins are seen turgid and black, blood flows profusely from the opening of the sinuses, and here, (as always when the circulation is retarded,) the surfaces are bedewed, and the ventricles in some degree filled with a serous exudation, which is greater in quantity, the slower the disease, or the longer the dissection is delayed. Often though there is a bursting of the blood vessels, no marks of palsy can be perceived on account of the deep stupor in which the patient lies, verging towards death, before the instant of their giving way ‡.

Palsy, though erroneously ranked with various other excited states of circulation in the class of Debilities, plainly arises from a high arterial action, and every state of excited circulation leads to it. It is that ultimate irremediable injury which the living system suffers, when the vessels of its most important organ suddenly give way under violent and unrepressed action; when blood is extravasated into the substance of the brain, its intimate structure partially destroyed, and half the body palsied: The

* "Si post primas uberesque phlebotomias apoplecticus hujus speciei, ad se non redeat prima die, de eo conclamatum est."

† Willis.

‡ That sudden and fatal apoplexy, such as takes place during the night with snoring and stupor, and is fatal before morning, is often unaccompanied with any organic disease, innumerable authorities prove. Every man must in his own practice remember many instances of sudden apoplectic death, and of sudden death too, from concussions and falls, unaccompanied by any apparent disorder of the brain, but merely with turgescence of its vessels. The following example is not unworthy of your notice:

moment this accident happens, the apoplectic, or febrile action terminates; the stupor lessens, and the patient awakes in confusion: he usually vomits in signal of the local injury of the brain: his senses are still confused; his face is slightly deformed, pale, and bloodless; the mouth is turned to one side, and the tongue palsied, so that though he sees, hears, and understands, he faulters, and cannot speak; he struggles, but cannot rise; one hand lies dead and cold, and one leg is motionless.

Palsy, like apoplexy, is a consequence of arterial impulse; by its nature it is sudden; by the ignorant and learned, equally, it is named the *Paralytic Stroke*: it is truly as much an accident as aneurism or bursting of an artery in any other part of the body: such bursting may proceed from peculiar delicacy, the vessels giving way under a slight action; or from irresistable impulse, which at once oppresses the brain, and stops, only when the vessels give way: it happens from accidental impulsion of blood towards the head, from heat, exercise, passion, or wine: it happens in surgical cases from shocks or falls: it happens in youth from frequent and sudden impulse of blood against vessels of unconfirmed strength: it happens under the delirium of fever, which ends sometimes in palsy, sometimes in fatal stupor: it is most frequently the termination of that peculiar state of action which we call apoplectic; thence we say, "apoplexy terminates sometimes in recovery, often in palsy, but most generally in death." When palsy proves fatal, we find blood recently extravasated: when the paralytic die, the brain, even at the distance

Peter Fasolati, an engraver at Padua, in the 62d year of his age, yet still of a full habit, and liable to no indisposition, died at the very same season as Tita, and even the very day after him, in the following manner: He had gone through no labour, had not been troubled with care and anxiety, as he had been used at other times, and made no complaint of any thing. He had even supped heartily, for he always used to eat freely; and desired to go to bed more early than usual, which he did; but two hours afterwards, his wife, happening to wake, found him not only dead, but even cold, and stretched out in the same manner he had laid himself when he went to bed.

The day following, when the integuments of the cranium were cut into, and while the upper part of the scull was sawed through, and taken off, much blood was discharged; *yet there was none at all extravasated within the skull; none in the substance of the cerebrum or cerebellum; and both these parts seemed, to the touch, to be perfectly natural: there was, I say, nothing ruptured, nothing injured in any part.* There was some water in the lateral ventricles almost limpid, but in small quantity; and some also seemed to flow from the sides of the cerebellum, which was sound, as I have said; or might it not come from the tube of the vertebrae? But *such a quantity of fluid blood distended all the vessels in and about the brain*, that I do not *remember to have seen the like before;* even some small vessels, which used to be scarcely perceptible, were extremely large and turgid."—*Morgagni, Sect.* 3.

of years, bears marks of the local injury; often there are found distinct aneurismal sacs and clots of coagulated blood.

From an organic injury which in a moment deadens, by injuring the sensorium, the most impetuous arterial action, all the functions must permanently suffer. In palsy, along with the muscular power, the intellectual, and even, in some degree, the vital functions are affected. The memory and judgment are visibly disturbed, and the difficulty of speech is not entirely in the organ but in the mind, which is hesitating, weak, and childish. The circulation, and the nutrition are languid, the stomach flatulent, the appetite sickly, the bowels costive, and the whole frame delicate: the body is no longer nourished as heretofore; the limbs shrink, even the single limb which supports the body, and which, by labouring more, should be proportionably thickened, also shrinks: But the vital functions, though faintly and languidly performed, are regular and equable, so that the paralytic live long, unless, by the recurrence of the arterial impulses and want of care, they are allowed to undergo successive strokes of palsy.

A symptomatic disease, like palsy, following occasionally such various affections, must require freer illustrations than any that can be embodied in the form of a definition.

First, It enters into the definition of all the diseases of the brain, whether purely apoplectic, or febrile, that they terminate in recovery, death, or palsy; or rather in death or palsy, for they rarely recover. The extreme vessels, within the delicate substance of the brain, may either be able to sustain the high action, or they may give way: If they continue entire, if no interposed remedies moderate the action, the apoplectic state is completely formed; the stupor and slow pulse show that the brain is oppressed, and death ensues: If they give way, the substance of the brain is injured; the injury to the organization extends, like the general oppresion, to all the vital as well as voluntary motions of the body; it does not suppress, but moderates them: the apoplectic impulse stops, the patient wakes from his stupor, but, is palsied on one side: nature, if not by a perfect, yet by a partial, interposition, arrests the dangerous arterial action, and saves the life. Thus wisely is the living body constituted: its curious mechanism qualifies its excessive actions: cellular effusion in the common inflammation of a limb, deadens and represses the too violent action of its vessels; and upon the same principle a similar exudation prevents the death, from excessive action of vessels, in the more noble parts, in the brain.

Thus, according to circumstances varying in each individual case, according to the violence of the arterial impulse, or the tenuity or peculiar delicacy of the vessels, it happens, that during the stupor of apoplexy, the struggles of convulsion, or the coma of fever (where the patient has lain many days in torpor, deafness, and passing his urine unconsciously), the vessels of the brain give way, and the patient recovers from the oppression of apoplexy, or from the deafness, insensibility, and stupor of fever, by becoming paralytic; nor can it seem surprising, that the pulse which is at last suspended altogether in apoplexy, by the oppression, should be moderated in palsy by a slighter degree of the same oppression.

Secondly, It often happens that under a slighter impulse, especially in younger subjects, the vessels suddenly give way, the apoplectic is anticipated by the paralytic state, and the hemiplegia, or palsy of one side, appears as an idiopathic disease. The period of menstruation in girls, and of puberty in boys, when the proportions of the body are changing, and its parts unfolding; when the actions of the arteries are violent, and their strength unconfirmed; when particular parts of the arterial system are more irritable, and the impulses, irregular, and at times accelarated, this dismal accident is liable to happen. The boy goes to bed apparently well; and, when he awakes, is palsified and unable to speak.

Many times I have seen a young person of 15 or 18 years of age, of a sanguineous system, and predisposed form, go to bed, overheated with exercise, with play, dancing, or with riding, or perhaps with wine, having a throbbing of the temples, and giddiness of the head, but unconscious of danger, sensible of no greater degree of confusion than what exercise has often caused, and youth and health dissipated. I have known a young person thus heated, awake in the morning palsied from vessels giving way through natural delicacy, with only a slight and no very unusual impulse of the blood, towards the brain. When the boy awakes, unconscious of what has happened, he finds his head confused, and his tongue faulters; his arm lies powerless by his side; he only struggles to move and attempts to speak: the apoplectic state would have been fully formed had the action been a little prolonged, but in such sudden palsy, it is anticipated by the bursting of the vessels; the impulse which produces apoplexy or causes palsy, is one and the same, but so transitory in a case like this that it passes unobserved.

I remember, with pain, the fate of a very fine boy of 17 years of age, in whom the arterial impulse was prolonged with very sensible effects, which were unhappily ill understood: how far he might have been predisposed to apoplexy by form or tempe-

rament, I knew not, for I never saw him till in a state of stupor, sitting, in a great chair, wrapped in blankets: his face was purple, his lips protruded, and his nostrils expanded; his breathing slow, but not stertorous; his pulse heavy and throbbing, but also slow: his head nodded forward, when set upright: he could be roused, but it was only to answer by monosyllables and impatient grunts. He had been several days in this condition, snoring when laid in bed, and in a state of torpor when set in his chair; had no complaint, no desires, no appetites, no wish but to be left at rest; he took drink when presented to him; could, by perseverance and teasing, be roused to something like conversation, but was perpetually apt to relapse into the lethargic state, nodding, and yawning, "while o'er his eyes the drowsy liquor ran." This young gentleman's situation had been so entirely mistaken, that his danger was aggravated by the very means thought of for preventing it. There was so little appearance of disease, that his silence looked almost as like sullenness, or sluggishness, as stupor: he was, when I was called, actually under a course of mercurial frictions: opium was administered every night at bed-time: his drink was port wine and water: the project of his cure was by mercury and sudorifics. Though I prevailed so far as to have him immediately bled, and leeches applied to the temples, and purged profusely, the apoplectic impulse was not subdued. On the second night, if I remember correctly, the vessels gave way: He was found in the morning paralytic, and is now lame and disabled for life. He has, like others thus struck, recovered his speech, the use in some degree of the left hand, and the strength of the corresponding leg; he is little emaciated; his speech continues slow, but without hesitation; his faculties are entire; and it seems to me, that his period of life, (his growth being not then perfect), has favoured his recovery.

I confess the recollections I have of this subject, viz. the predisposition to palsy, are so far from being correct, that they may be as well named prepossessions as recollections; but were I to name the periods of life in which palsy is most frequent, I should name those in girls, at which the menses first appear, or that in women, at which they cease to flow; and in boys, the age of puberty, and in men, from the 45th to the 50th year. At particular times a slight impulse, even a paroxysm of intoxication, will thus injure the texture of the brain. The abuse of spiritous liquors of the worst description, which government almost promotes, and which the poor, who know no other solace, cannot refrain from, peoples our streets with men, under 40 years of age, trailing one leg,

and starting and staggering along; the abuse of opium in Turkey is not more flagrant or disgraceful.

There are some obvious conclusions, some recollections of the peculiarities of the brain, applicable to this subject, which surely will not escape you. The brain is delicate in its texture, and in its vessels, and is liable beyond all the other parts of the body to ecchymosis and effusion of blood into its substance; thence palsy follows an infinite variety of disorders: the apoplectic or febrile impulse, shocks, falls, even violent bodily exertions, burst the delicate blood vessels of the brain, and are thus occasionally the cause of sudden death. The universal influence of the brain over the intellect, the sensations, and the vital and voluntary motion is such, that those slight extravasations which, in the liver, lungs, and other viscera, of slight consequence, and easily remedied by the natural powers, have, when they happen in the substance of the brain, the most fatal tendency. The insensibility of this organ, the source of sensation to all the others, is so particular, that frequent as rupture of vessels, destruction of substance, and consequent palsy is, we cannot remember that the patients suffer any thing but confusion of head: The patient is astonished, sickened, paralysed, but not pained, though this important organ, and its dependant motions, are quite ruined.

Typhomania, coma vigil, coma febrilis, apoplexia symptomatica, are various names for those affections of the brain which acccompany fever. Febrile Apoplexy, Caros Febrilis, is that apoplectic affection of the head which is accompanied with pulsation of the temples, flushed face, blood-shot eyes, and a rapid pulse, but the disease is merely apoplectic and peculiar to the head. The Apoplexy of Fever is a symptom of a disease, naturally characterised by heat, thirst, a foul tongue, a sick stomach, and a rapid pulse; when delirium or coma accompany fever, they vary in their degree, are not essential symptoms of fever, and are yet almost inseparable from it; they add to the danger, and are the chief signs from which our prognostics are derived. Typhomania, so named from Typhus malignant, or low fever, and mainomai insanio, is that stage of arterial excitement in the brain, in which the patient seems to sleep while he is really awake; he lies in a degree of stupor from which he is easily roused; stares, mutters, struggles, talks incoherently; and, after an interval of delirium, sinks down again in stupor. This condition is frequent in fever; it is symptomatic of the affections of the brain; it is the active declining into the oppressed state of the circulation: the stupor or compressed state has begun, but the high arterial action or delirious state has not yet

ceased. This mixed state of delirium and stupor is by no means peculiar to fever, but is extremely frequent after injuries of the head; for, after injuries of the head, the patient, often in the midst of stupor, rises, stares about him, falls upon the attendants, struggles, and sinks again into a state of stupor.

Coma is the apoplexy of fever; it is increasing stupor, unmixed with delirium, from which the patient is difficultly and imperfectly roused; it is distinct from sleep; it is that state of the brain which succeeds delirium, when febrile delirium, violent and furious, having continued long, the patient sinks at each interval into coma, which at last becomes continued. When in *Typhoid Fever* the low and muttering delirium has continued long, verging gradually towards coma with subsultus of the tendons; or when from a sudden and very violent impulse of blood towards the head, (as in peculiar types of *Intermittent Fever*), the patient, after a short delirium, has fallen into a state of torpor, accompanied with stertor, the coma or still and stupid state comes on, it is a sign of fatal import. When, during a state of febrile coma, the stools and urine pass involuntarily, the patient's fate is determined; when the delirium or stupor ends in palsy, from the vessels of the brain giving way, the febrile action ceases, and the patient is saved: ("Hemipligia rite succedens, aegri mortem ad annos procrastinat;"*) always the state of the brain proves, upon dissection, that those who die of fever, die apoplectic.

These varieties, and alternations, of the delirious and apoplectic states, have proved too slippery to take any precise or permanent form, in the moulds cast by the nosologist, and are intelligible only when regarded in a pathological point of view. As pictures of disease, definitions, involving at once delirium, and coma, rage and stupor, must be inconsistent; but as suggesting to us the prevailing state of the sensorium, or the state of the circulation within the brain, every combination of those signs, however discrepant, must be interesting. It is from the state of the intellect and sensations, that we take all our prognostics in fever; it is from the ultimate state of the brain, (the regulating organ of the system,) that we are to expect recovery or death; and how difficultly an organ so delicate as the brain, requiring such a volume of blood to be circulated through it, and that volume increased, and its transit accelerated by every general disorder, even by a fit of laughing or coughing, can escape injury or utter destruction where febrile action prevails; how the structure of the brain can be one moment safe under the sudden impulse of an intermit-

* Sauvages, p. 470.

tent, or during the long course of a slow fever, is a very natural subject of reflection, now while we are speaking of coma or the apoplexy of fever.

1st, *Intermitting Fever* is accompanied with delirium and coma, sudden violent, and dangerous in the last degree. If exercise, wine, passion, or opium disorder the circulation of the brain, well may the sudden invasion of an intermitting fever have the like effect. But it is not the mere impulse of the blood, great though it be in every intermittent fever, that causes stupor, but an excitement of the arterial system of the brain peculiar to the intermittents of certain seasons, which often precedes the paroxysm in the form of a slight vertigo, resembling that of drunkenness, is visible during the cold stage in confusion and wavering, rises to delirium in the hot stage, and terminates in a stupor which, if it continue after the paroxysm, is usually fatal. This stupor of the brain, is frequent in autumnal remitting and intermitting fevers: it is frequent in the fevers of Italy and of hot climates: such a state of excitement often seems peculiar to certain seasons or constitutions, (as Sydenham expresses himself,) when something singular in successions of the heats, colds, and dews of autumn contribute to form this impulse towards the head. There is a form of Apoplectic Intermittent which has been distinguished by the name of Tertiana Carotica*. A tendency to excited action of the arterial system of the head urged on by such a sudden and general acceleration of the pulse, as that which accompanies a tertian paroxysm, cannot failto produce its effe ct instantly. The tendency is evinced by slighter wandering of the senses in the first, and second ague fit; in the third, the delirium comes on, and terminates in stupor early in the hot stage, the stupor survives the paroxysm, if it assumes the form of complete apoplexy, accompanied (unlike any other febrile coma) with snoring and oppressed pulse; and is certainly fatal. Here we perceive that no debility nor general disorder, produced by the fever, is the occasion of death; one organ alone, the brain, suffers; and this affection of the brain runs through all the stages of headache, confusion, delirium, and stupor, or total palsy, in a period inconceivably short.

2*d*, *Continued fever* produces changes in the circulation of the brain slower, but not less terrible, than these. The active or delirious state continues long: the comatose state advances slowly: the progress from the common headache of fever to deli-

* Carotica and caros are superadded to those diseases to express the tendency to sleep or stupor, as carotides are added as a sort of cognomen to the arteries of the head, implying that sleep or stupor is induced by their morbid obstruction, or by tying ligatures upon them. The synonyme by which the apoplectic intermittent and its varieties have been designated are CATALEPSIS QUARTANARIA, APOPLEXIA FEBRICOSA, TYPHOMANIA FEBRICOSA, CARUS FEBRICOSUS, TRITAEOPHYA APOPLECTICA.

rium, from delirium to lethargy, is slow; and the various degrees are denoted by the terms of Typhomania Continua, Lethargus a febre, and Coma Lethargicum: It is this kind of lethargy, (distinguished from apoplexy by want of stertor), which puts a termination to our nervous fever, or Typhus, to the delirious fever of confluent small-pox, and to the jail and hospital fever, which often are marked, even in their commencement, with delirium. There is a kind of febrile delirium which affords the most favourable prognostic; it is that in which the patient, not irascible, angry, nor furious, lies on his back, in a pleasing trance, and thinks he hears the ringing of bells or music, and sees brilliant lights: these are signs of convalescence; they are, I believe, the natural and healthy sensations renewed, but as yet indistinct. There is another delirium in which the patient when roused looks furiously, speaks wildly, struggles, and raves: as this kind of delirium advances, it is accompanied with more of stupor: the patient lies muttering and motionless: the alternations of furious delirium and stupor are irregular, and accompanied with corresponding changes of the pulse: when the stupor is accompanied with picking of the bed-clothes, inarticulate continual muttering, subsultus tendinum, and involuntary stools, the brain is ruined, and the patient gone. The state of the brain in those who die of fever prove this, for it is completely apoplectic: the slow recovery of those who survive, show the injury it has sustained: it is not because the muscular parts have been injured during fever by high vascular action, by want of nutrition, or by rapid absorption, that the whole frame is left so feeble: the indistinct and confused sensations, the loss of memory, the impaired intellect, the gradual recollection of former knowledge; the slow recovery of the reasoning powers, along with the feebleness and trailing of the limbs, which are long of regaining their vigour, demonstrate how much the brain has suffered, and how slowly it is restored; in many it never is.

The more malignant the fever, the more unequivocal are the marks of diseased brain; all the fatal and sudden fevers of warm climates are fevers of the brain, and they are nearly allied with the coup de soleil or sun-stroke. The soldier, after being exposed to the sun, seems drunk, is giddy, raves, becomes delirious, falls into a stupor accompanied with vomiting, and dies. It is obvious, that while the movements of the living system are regulated by the irritability, its solids and fluids are still subject to every physical law; and I have no doubt, that the phenomena of coup de soleil and yellow fever are attributable to the expanded volume of blood in plethoric systems operating upon the brain. When a boy or a labourer lays himself to sleep in the sun, and is found in a state of stupor, with no increase of pulse, with no stertorous breathing; when bleedings, and the effusion of cold water on the head,

are unavailing and the patient dies; when there is found, on dissecting the head, no inward disorder, nor extravasation of blood *, what are we to presume but that the apoplectic state, unforced by any violent arterial action, but proceeding merely from expansion of the volume of blood, has become suddenly complete, but simple, and unattended with any yielding of the veins or arteries? that the vessels of the head have undergone the same universal dilution, that is visible in the hand when exposed to heat. The effects of such a condition of its blood vessels on the vital functions of the brain, you are well aware of, and will not wonder if, sometimes, a full plethoric man exposed in a hot climate to the direct rays of the sun, while he is awake in exercise, and exposed to other exciting powers, suffers such a sudden congestion of blood within the head, that he raves, or is convulsed, or bleeds from the mouth and nose, before he falls down and dies.

Fever is a disease so directly connected with the state of the brain, that it could not seem very extravagant, were I to refer a combination of symptoms consisting of irritated actions, unnatural sensations, and disorder of the intellectual powers, to an affection of the sensorium; but, in place of laying down a theory of fever, I shall plainly state the facts, and in place of ascribing the worst of all fevers, the yellow fever, to the state of the sensorium, I shall refer you to the phenomena during life, and to the dissection of the brain after death.

3. *The Yellow Fever* †, which has been pronounced a disease of debility, affects, most fatally, the young, the robust, the plethoric, those who have just arrived from

* *Carus* ab insolutione, coup de soleil, est omnium sensuum et motuum cessatio, pulsu et respiratione pacatissimis, imo *imminutis* omnibus artubus flaccidis, calore tamen et colore remanentibus, quam aliquoties observavi in pueralis, qui ad solem diu steterant aut dormierant, nec poterent ab hoc sopore excitari: lethalis toties fuit hic morbus et brevissimus: phlebotomiae repetitae, frigida capiti admota sine successu adhibita sunt; pulsus erat minime febrilis; *secto capite nihil laesi inveni.*—*SAUVAGES.*

† Let it not be imagined that I am so infatuated with the importance of the subject, as to ascribe universally the disorders of the body to the diseases of the brain. This would be writing in the manner of that physician, to whom, as to many of our tribe, Sterne showed little charity. "Plato seems in this (says Sterne) to have been a man of much the same temper and way of reasoning with Dr Baynard, who, being a great enemy to blisters, as imagining that half a dozen of them would draw a man as surely to his grave as a herse and six,—rashly contended, that the devil himself was nothing in the world but one great bouncing cantharidis."

It is my professed intention to establish an analogy betwixt the apoplectic state of the brain and the condition in which it is found, (and the stupor with which that state is accompanied) in the last

sea, in perfect health, who are full of blood, who live unrestrained : while women, children, old men; and those emaciated by the heat of the climate, escape. The French, of spare habits, living abstemiously, and who are prepared by purges, evacuations, and temperance, are safe. The British soldier, who resigns himself to all kinds of licentiousness; who feeds according to the custom of his country, drinks of fiery rum grossly, fresh from the still ; revels in the streets all night ; sleeps under a wall, and is in the morning exposed to the sun,—dies. Among officers, friend meets with friend ; their convivial meetings are protracted ; they are willing to believe that wine is a preservative, equally, against the dangers of the climate and the horrors of infection ; they part, in a state of intoxication, many of them never to meet again (*a.*)

stage of fever ; but I am too well acquainted with the many peculiar phenomena that fever exhibits, to ascribe it solely to the state of the brain. The functions of the skin, the bowels, the arterial system, are all disordered : the stomach is affected with nausea, the bowels with diarrhœa, irresistible and incessant ; the skin is parched and withered like an autumn leaf, unable to perform its needful functions, and hardly retaining its connection with the body ; the blood vessels allow their contents to ooze out through all the pores or extremities, or at the surfaces of the body, forming vibices petechiae, specks, and points, and blotches of extravasation and contagious fever, in common typhus ; and stripes of yellow and purple, of complete and incomplete extravasation, down the face, neck, and back, in yellow fever : often the salivary glands pour out their secretion in a copious continued stream, till the patient is exhausted ; and always, towards the conclusion of the dise se, the vomitings and stools are blackened by blood oozing profusely from the vessels of these surfaces : Yet still he predominant, the inseparable, the fatal symptom, is disorder of the brain, vertigo, headache, idiotism, delirium, coma, according to the degree of the fever or the constitution of the patient.

The following notes are a vindication of what is delivered in the text. They are so arranged as to correspond with the theorems they are meant to prove. They are high authority for practical facts ; since, as will be found in running them over, they are the fruit of severe, constant, steady observation, by men placed in scenes which allowed no trifling ; men sincerely desirous of discovering the truth, and delivering it faithfully ; their own lives, as well as those of thousands, were at issue. They are chiefly taken from the works of Dr Trotter, Dr M'Lean, Dr Jackson; the two latter gentlemen were companions in that scene, where ten thousand fine fellows, and almost all the medical staff appointed to attend them, were, in but a few months, laid under the turff. Dr Jackson, as well as Dr M'Lean, did his duty fearlessly, and with perfect zeal ; so that I may safely say, I know no man who " puts so much of his heart into the act :" His histories of this Endemic of the West Indies are not splendid narratives, but plain, honest, faithful, and useful.

" (*a*) The youth of the patient, and a plethoric state, were invariably circumstances of danger. The state of body, in which the patient was at the moment the disease invaded him, influenced my opinion of his safety. If it came on, after the indirect debility of a debauch in wine, and sitting up late, there was always very considerable danger ; nor do I recollect almost an instance of a favourable termination, where the fever thus commenced. I remember being once present at the flank mess, on the Hill, at Port-au-Prince, when considerable quantities of wine were drank, and the parties sat up very late. My duty required

It frequently happens that on the evening before the fever is formed, before the man is conscious of being seized with this fatal disease, before the headache or delirium have begun, he is affected with a stupor more resembling intoxication than fever, insomuch that even the experience of a Trotter, or a Jackson, hardly suffice to distinguish the true condition of the soldier thus attacked; he is in danger of being regarded as a culprit, and being subjected to military punishment, while he is really in the first stage of fever (*b*). To this giddy and tipsy feeling, headache succeeds, and is the first sign of danger; headache, lassitude, listlessness, despondency, an entire indifference about life or its concerns, are usually the first symptoms of disease; and often, with the headache, there is giddiness, drowsiness, stupor, resembling those of deep intoxication (*c*); apoplexy sometimes appears; while affections of the stomach, nausea, hickup, undefined and undescribable feelings, are inseparable from this confusion of head. Often the severity of the headache is so great, so sudden, so peculiar, that no words can express the sensation so well as those rude ones in which the common soldier usually describes his own feelings, viz. "a maziness," (as he usually terms it,) "to a degree which gives the "impression of being knocked down by the blow of a hammer, a stupor like

me to leave them at a seasonable hour; but three of the party were next morning seized with fever, and two of them perished on the fourth day. I think it necessary to be thus explicit on a subject that so nearly interests us all."—*M'Lean.*

(*b*) There is a species of delirium that often attends the early accession of *typhus fever*, from contagion, that I have known to be mistaken for ebriety. Among seamen and soldiers, where habits of intoxication are common, it will sometimes require nice discernment to decide; for the vacant stare in the countenance, the look of idiotism, incoherent speech, faultering voice, and tottering walk, are so alike in both cases, that the naval and military surgeon ought at all times to be very cautious how he gives up a man to punishment under these suspicious appearances. Nay, the certainty of his having come from a tavern, with even the effluvium of liquor about him, are signs not always to be trusted: for these haunts of seamen and soldiers are often the sources of infection.—*Trotter, p.* 12.

April 16th 1795. P——n, attendant on the sick in the hospital at Dorcum, *went out in the evening to light a candle, and returned in a few minutes giddy and stupid, as if dead drunk; considered as such, by his companions, he was concealed from the medical officer for twelve hours;* next day, he shewed marks of an oppressed brain; he was deeply *comatose*; the pulse was nearly *extinguished*; the skin was purplish, cool, and clammy: he was *speechless*,—and died in the night, in less than thirty hours from the attack.—*Jackson, p.* 126.

(*c*) Headache, if not actually the first, is among the first symptoms of this, as of other fevers; and the nature of the headache is different in different subjects, sometimes it is almost insupportable,—confined more particularly to the forehead and temples, accompanied by sensations of tightness over the eyes, turgescence and starting; sometimes the pain is more generally diffused, dull and obscure; but it, for the most part, differs from the headache of ordinary causes; though the difference is not easily defined. Headache is almost always present in the commencement in some degree or other; it sometimes abates in the course of the first twelve hours, frequently in the first forty-eight, and almost always before the termination of the third day. During the severity of the pain, the forehead is sometimes hot and burning, sometimes cold and clammy. It happens also, and not unfrequently, that together with, or instead of headache, *the attack is ushered in by giddiness, vertigo, drowsiness, or stupor like deep deep intoxication: fits of apoplexy, hysteria or tetanus*, are observed sometimes, but they are upon the whole rare, and by no means characteristic of peculiarity.

" that of deep intoxication, a total inability of holding up the head (*d*):" headache, vertigo; temporary loss of sight; a red, staring, and muddy eye; a countenance either flushed or grim with sickness; depression of spirits and feebleness of limbs, form the assemblage of symptoms by which the commencement of this fatal fever is marked (*e*).

But after 12 hours, or more, of headache, dejection, coldness, small frequent irregular pulse, the pulse becomes hard and tense; a burning heat diffuses itself over the body; the pain of the head, which had abated, is aggravated; the pulsations of the carotid arteries are such as make the head shake with its force; with a sense of fulness, weight, and heaviness through the whole head; drowsiness and coma, but coma vigil, without the power of sleep (*f.*). It is after this reaction, this circulation first perturbed and then excited to such violence, that the yellowness or extravasation appears in streaks, marking the features as if they were touched along the prominent lines, with yellowness running down the cheek and neck, and accompany-

(*d*) The signs of the commencement are not very different from those of other fevers, viz. disagreeable sensations at stomach, nausea, flatulence, listlessness; languor, feeble action of the moving powers, sense of cold, or want of natural warmth, headache, from heaviness and confusion, *or maziness as the soldier usually terms it, to a degree which gives the impression of being knocked down by the blow of a hammer,---a stupor like that of deep intoxication,---a total inability of holding up the head.* The appearance of the eye and countenance indicates srrongly a material deviation from health, but an accurate picture is not easily conveyed in words; the eye is sometimes glossy, the look vacant and idiot-like, torpid, sad, and desponding, the countenance collapsed, dry, and withered like a plant nipt by frost, or failing from want of rain."—*Jackson, p.* 167.

" February 20th, 1790. W——n, an orderly attendant on sick, had been drooping for some days, but said nothing; to-day seized suddenly with pain of the head, as if knocked down by the blow of a hammer; the eye white, glossy, and inanimate; the countenance grim and cloudy, with a tinge of a dusky yellow, exhibiting a colour not unlike that of mahogany."—*Jackson, p.* 127.

(*e*) " The attack of this form of disease is usually sudden, the sense of cold or even horror is considerable, and frequently alternates, during the first hours, with sensations of burning heat; the *headache is often intensely severe*, particularly the pain of the forehead and temples,—it is *frequently preceded by giddiness, vertigo, and temporary loss of sight;* the eye is often muddy, confused and red, staring and prominent, it sometimes seems to blink, or shun the light; the countenance is flushed, or rather overcast and grim, often agitated and confused."—*Jackson, p.* 172.

(*f.*) The pain of the head, which had in some degree abated, recurs again, but it recurs with sensations differing from the former; marks of *increased determination are now evident, the pulsation of the temporal*, and particularly of the carotid arteries is sometimes so violent, as to cause the *head and neighbouring parts to shake*; there is also a sense of fullness, weight, and heaviness through the whole head, sometimes with *drowsiness and coma*, but without the power of sleeping; the recollection is confused, and not under command, but that derangement of the reasoning faculty, properly called delirium, is a rare occurrence. The countenance *is highly flushed, sometimes dark and cloudy; the eye is muddy and inflamed*; the urine is scanty,—sometimes suppressed: the *bowels are torpid*,—difficultly moved by purgatives,—or moved by starts,—the evacuations, watery and in excess, do not afford relief; the skin is generally dry, and the heat is unequal.—*Jackson, page* 184.

ing, in a particular manner, the course of the jugular veins *(g)*, becoming every moment yellower, and at length violet and livid towards the end of the disease *(h)*. This extravasation is the fatal sign.

How reserved and prudent should our profession be in ascribing diseases to imaginary causes: the speculative physician, who, sitting in his closet coolly, proclaims this to be a disease of debility, is unconsciously pronouncing the doom of thousands, while those who have faced the dangers of climate and infection, men called, by every humane and every selfish motive, to observe and report truly and faithfully the nature of this disease, deeply implicated in the tragical scene, whose lives surely pay the forfeit of their own ignorance, have declared, with unanimous voice, that bleedings, profuse repeated bleedings *(i)*; the abstain-

(g) The remittent is at times uſhered in with convulsions, which I have seen repeated at the periods of axacerbation. About the third day, sometimes on the evening of the second, or perhaps as late as the fifth, the yellowness begins to make its fatal appearance *in streaks along the cheek, forming angles with the alae of the nostrils; they purſue the courſe of the jugulars;* the back is also tinged in the same irregular manner; the firſt streaks extend, and become more apparent; the vessels of the eye are evidently affected, and in a few hours the whole body assumes a golden hue; the black vomiting increases, and becomes darker; the patient feels at once relieved, from the pain in his stomach; talks of his happy sensations, which, alas! are only deluſive.—*M'Lean, page* 92.

(h) The skin appears to loſe its natural sensibility, it becomes impervious, and seems, as if it were ſcarcely connected with the living system; the colour, which from the commencement of the period of subsiding, had been gradually becoming more and more yellow, in the latter ſtages is often violet and livid,—in which caſe the pulſe is usually ſmall, deep, and oppressed.—*Jackson, page* 187.

(i) A fever appeared, at Philadelphia, in the years 1793, 1994, and 1797,— of great force and unuſual mortality; in the cure of which, a combination of evacuations,—bleeding and purging to great extent, obtained general credit, among the more enlightened and induſtrious practitioners of that city. The view is wholly directed to depletion; and the quantity of blood which has been taken away, on many occaſions, by the phyſicians of Philadelphia, without deſtroying, or even endangering life, appears enormous; furniſhing a fact, which cannot fail to confound those who have asserted, that bleeding is improper in the violent fevers of hot climates, even that the loss of a few ounces of blood is almost a certain cauſe of deſtruction. The principle of cure, among the physicians of Philadelphia, hinges, as observed, wholly in depletion. The author of this outline employs their chief remedy; but he employs it with a different view, and with different management. At Philadelphia sixteen ounces is reckoned a large bleeding; but bleeding to this extent is often repeated, and accompanied with strong mercurial purges, all tending to diminish the suppoſed, or real increased action. Here bleeding is directed to the amount of thirty ounces, or upwards; in short to such extent, that an impression be at once made upon the system; after which, such powers are recommended, as stimulate to a train of action, congenial to the action of health. The principle is different, in as much as there is a difference between interfering and leaving a business in the middle, or in interfering and conducting it forcibly to an issue.

The Author's Treatment of the Remittent, after considerable experience.—Whenever I was called to visit a person attacked by the Remittent in the manner already described, if there was any inflammatory disposition, or that the patient was a stranger lately arrived, I instantly bled him in proportion to his strength and the urgency of the case; the quantity can only be ascertained by the circumstances then preſent, and cannot be regulated but at the patient's bed-side.—No directions can be given in words, that would apply to any number of cases; as minute occurrences often guide the physician. I am, however of opinion, that much depends on the evacuation being liberal at first.—*M'Lean, page* 164.

ing from wine; the pouring cold wine profusely over all the body; the purging with calomel, and sickening with James's powder, afford the only chance of saving life. "If the pain of the head," says Dr Jackson, "be severe, with sensations of fulness and tension; the pulsation of the carotid and temporal arteries violent, with eyes red and turgid, the pulse tense, confined, labouring, and as it were obstructed; the heat ardent and concentrated, with burning sensations and anguish at stomach, the foundations of mischief are laid, and destruction, unless speedily averted, may be expected to be the consequence."

"Begin with cutting off the hair, and shaving the head; place the feet in warm water, and allow blood to flow from the arm, not as measured by ounces, but till the headache be removed, and the existing state of the circulation actually changed; cold water, or rather water artificially cooled, by the solution of salts, being then poured upon the head *."

Dangerous and loathesome as dissection must be in such climates and such a disease, Dr Jackson has given us an unpremeditated, undisguised, account of the ac-

But the pale relaxed habit never produces denſe and red blood. Physicians have drawn ſome conclusions from this phaenomena. They refer that the first class bear blood-letting, without any material injury, and often with advantage; whilſt the second, cannot bear without evacuation, without injury to the conſtitution. *Impressed with this doctrine, I held blood-letting in a warm climate to be in general improper*; without reflecting, that although this reaſoning might apply to those, who had for any time resided there, it could not apply to new comers, who had not been exhauſted by perspiration or relaxed by heat.—*M'Lean, page* 130.

Here we have the pleasure of seeing men bred in the paradoxical schools, renouncing those delusions, and subscribing to the invariable practice of those who best knew the disease.

The excitements of passion or wine have the ſame effect as in the apoplectic. Whilſt the disease, (says Dr M'Lean in deſcribing the caſe of a young officer under his care,) was thus holding its victorious career, he became, in a remarkable degree, attached to wine, and intreated me, in a manner too earnest to be refused, to let him have some. I had heard of cures performed sometimes from this delusive call, as if it were the voice of nature preſcribing to herself; and I accordingly indulged him with such portions, as I conceived he might bear without exhausting him; he seized the wine with avidity, pouring on me many benedictions for what he termed the only gratification he could enjoy. The disease, however, continued to increase, his senses gradually decayed, he passed his faeces in bed without any sensibility, and, altogether, became the most distressing spectacle I had ever witnessed. On the twenty-first day from the commencement of the disease he expired, whilſt, in a fit of delirium, he was attempting to get out at the window.

Thus periſhed two young men of great promiſe; they were the firſt I ever attended in the Remittent of St. Domingo.—*M'Lean, page* 109.

I understood, however, that next day, he had an exacerbation, and vehemently demanded some porter or wine, which being delayed or refuſed, he was agitated by a moſt furious passion, after which he ſunk into an irrecoverable debility, and expired with spasms and convulsions. This is not the only instance in which violent excitement has proved suddenly fatal.—*M'Lean.*

* Jackson.

tual state of that organ, on which all the vital and voluntary motions have a direct dependence, from the condition of which many of the worst symptoms and most dismal prognostics are taken : I will not alter words which seem almost imagined, for the very occasion of proving that febrile stupor is one link in the apoplectic state of the brain.

APPEARANCES ON DISSECTION IN YELLOW FEVER.

" THE Brain appears upon dissection to be more or less affected in the majority of subjects, who die in the acute state of disease, or under the actual influence of fever ; the membranes, as noticed above, are then inflamed, or the blood vessels turgid to an extraordinary degree, give an appearance of commencing gangrene rather than that of inflammation, properly so called ; water is sometimes found in the ventricles, with evident effusion in the interstices ; but this is an effect,—not general,—not even frequent."

" The vessels of the head, in the first form, are frequently full and distended with blood ; in some particular instances, marks of inflammation in the membranes, adhesions and sometimes cheesy exudations near the falx :—water was found in the ventricles on some occasions, but this was by no means a common occurrence—it seemed to be more frequent in diseases of type, than in the violent continued fever ; the *distension and fulness through the whole volume of the brain was considerable.* In the second form, particular marks of inflammation were seldom visible, but the *venous system was uniformly* and generally *distended, as if filled by a successful injection* ; yet upon the whole the general distension of the brain was less conspicuous than in the former :—the *plexus choroides was often a clotted mass of blood* ; the prominent features of disease, previous to death, consisted in a pale and lifeless aspect, in a state of pulse *uncommonly slow,—perhaps under forty, power of motion diminished in an extraordinary degree, but without actual palsy (k)*".

(*k*) That determination happens to the head, is indirectly proved, *by the coma often present ; by the flushing in the face, and the visible action of the arteries about the neck and temples ;* and directly by dissection, which shows actual derangement, and marks of fullness in the vessels. But what is more to the point, in cases where the indirect proofs have occurred, great suffusions of a clear fluid have been found in the brain. This clearly argues an increased action of these vessels, and an unusual fullness in consequence. I know, it is difficult to draw precise and just conclusions from the state of the brain after death ; *because in the struggles of dying, and the peculiar circumstances of respiration during these agonies, almost every one dies in a state of apoplexy. And hence, the vessels of the brain appear over distended on dissection, though this distention might not exist till a few minutes before death.—M'Lean, p.* 174.

LETHARGUS SOMNOLENTIA, Diathesis Soporosa, The SEROUS APOPLEXY, the apoplexy of old age, is a distinction truly founded in the state of the brain: it is a disease rare, or rather unknown in youth, unless you account the stupor of slow and nervous fever, or the fatuity that follows it, a degree of this affection: it is frequent from the 40th to the 60th year. It is a disease arising from the slowly increasing dilatation of the veins, and increased effusion on the surfaces of the brain; changes which, though common to all parts of the body, produce more sensible and alarming effects on the brain. Men of big, relaxed, and corpulent habits, pale, bloated, plethoric, and self-indulgent, who, from affluence and indolence, have lived an inactive and sensual life, are peculiarly subject to lethargy. That dilatation and languid circulation of the veins, which increases as we advance in life, and which probably checks the sound and natural action of the arteries, and puts a period to the healthy function of the organ, is increased by gluttony and indulgence, by inebriety, grief, sorrow protracted, and intense studies, (qui libris diu impulescunt, vitam agentes sedentariam): relaxed circulation, is invariably accompanied with increased exudation, till, at last, the faculties begin to fail; the activity of mind is first impaired, then the memory, and the judgment last of all, for as there is no arterial excitement there is no delirium in this disease*. First is observed a propensity to sleep, the patient snores profoundly, sleeps long, is roused with difficulty in the morning, and is hardly awake during the day: he is more indifferent to his affairs or usual occupations, falls asleep instantly after a meal, especially after dinner, and slumbers over the most amusing book, or in the most animated circle of friends: at last he slumbers incessantly; at table, in his chair, in his office, amidst his public functions; he falls into a degree, not of stupor, for he can be roused, but of torpor, which unfits him for every duty: he stops in the midst of giving orders, forgets what he has said or wished to say, becomes indifferent to all external objects; sleeps or slumbers in whatever posture you place him,

* Qui morbo isto laborare dicuntur, aut magno ejus *insultu* plane decumbentes, in tantum sopore obruuntur, aut vix ab ulla sensibilis objecti impressione excitari queant: quin à punctione, aut vellicatione acriori, si forsan oculos aperiunt, aut membra surrigunt, denuo statim insensiles facti reclinant, et non raro, cum sibimetipsis relinquuntur, *somno perpetuo* indulgentes, transitione facillima *mortem* ipsam, quam in *Typo* simulabant revera obeunt; cujusmodi paroxysmus saepissime *febrem* adjunctam habet, quae tamen, cum aegroti evigilant, et ad se perfecte redeunt, plerumque sponte cessat. Vel 2. pro *lethargi* habentur, qui sensuum torpore immodico oppressi, in somnum fere semper proclives reperiuntur; ita ut medio itinere, immo inter prandendum, aut quodvis aliud agendum, subinde in torporem prolabantur.—*Willis, De Lethargo.*

whether in his chair, or recumbent: his speech is slow, interrupted, and paralytic like; however much roused, he immediately sinks down again; by remaining unassisted, being suffered to snore and sleep, exposed to the fire, or in a soft and downy bed, by being over fed, not purged, nor roused, nor stimulated, he becomes truly apoplectic; and a person who might have been saved and long preserved, as I know from experience, in passable health, dies with stertor and an oppressed pulse.

The increase of the serous effusion is inseparable from every state of oppressed circulation, as anasarca is from the state of a limb compressed by ligatures or tumours; it is accordingly found in all dissections of the apoplectic, epileptic, inflamed, or delirious states of the brain. This serous apoplexy, or lethargy, requires not bleeding, for there is no apoplectic impulse; it forbids not vomiting or blisters; it requires rather purging, sudorifics, and mineral waters; exercise, and early hours; abstemious diet, but consisting of animal food, with a little wine.

The Hydrocephalic State is a serous effusion, but of a very opposite nature, never occurring in the aged, rarely in adults, frequent only in childhood, from the third to the seventh or tenth year; proceeding, not from dilated veins and slow effusion, but suddenly arising from high arterial action, as serum is effused in an inflamed abdomen or herniary sac. It is a kind of serous effusion, not preceded by torpor, indifference, slumbering, loss of memory or intellect, but by headache, fever, and the most agonizing screams; and, when the effusion takes place of the arterial action, squinting, dilated pupil, stupor, and convulsive and horrible distortions, close the scene. It is not a dropsy, a slow and harmless effusion, nor is the exudation of serum, distending the ventricles, the cause of any one symptom, except the stupor of fatal prognostic; it is purely an inflammation of the brain.

Is it against pathology that the masters in our profession should inveigh, as if that were the department of our science the most subject to abuse? By no means! It is by substituting conjectures to enquiries, by delighting in their own fancies, and neglecting facts, that the work of refutation is endless: "One buildeth a wall, and another daubeth it with untempered mortar: say unto them that daubed it with untempered mortar, that it shall fall." There is no good cause why pathology, the only precious part of our science, the sole theory that can be supposed permanent, should be excluded from the definition of disease, since the cause is indeed the disease, the thing to be described, without expressing which we define nothing. I see no reason why we should cir-

cumscribe our descriptions of disease to such outward signs as may be seen in the living body, (quae sensibus in viva homine distingui possunt); it is no treason, as far as I can perceive, against the common cause of the science, to join, with the marks and external signs of disease, the phenomena we discover in the dead body. Let the dissection of the dead body be your last appeal in every difficulty, your sole argument in proving the truths of your science: in place of sitting meditating on doctrines in your closet, walk your rounds of practice with zeal and diligence: degrade not your science with a succession of conjectures, when you may establish a chain of facts: when your patient dies, and you are doubtful what precedent his death affords, leave nothing to conjecture, be careful to enquire the very truth;

> "Enter his chamber, view his lifeless corpse.
> "And comment then, upon his sudden death."

SKETCH, OR ILLUSTRATIONS OF THE PARALYTIC STATE OF THE BRAIN.

PALSY is bursting of the blood vessels, with destruction or damage to the substance of the brain, accompanied with irrecoverable lameness of the opposite side of the body:—I know no exercise of the reason, more calculated to improve your talent of observation, to enrich your mind with various analogies, to ripen your notions of the actions and accidents of the circulating system, or to attach you to your profession, as a science founded on true and physical principles, than an inquiry into those consequences which so invariably accompany even the slightest extravasation in the substance of the brain. Let us renounce unequivocally all weak pretensions to a philosophical theory of nervous energy, and proceed, in simplicity and modesty, to record the various species and degrees of extravasation which take place in the brain: we shall then find ourselves engaged in the investigating a suite of facts which have a natural and very interesting connection with each other, and with all the most important, and far the most frequent diseases and accidents to which man is liable: we are, perhaps, far from knowing all the causes of palsy; yet what we do know, is so clearly proved as to guard us from the fascinations of speculative doctrine; we can not deviate into mere theory, nor do otherwise than pursue, steadily and soberly, the line of facts which explains the incapacities and infirmities, produced

at once in mind and in body, by partial injuries of the brain: in an enquiry so purely physical, depending on direct and obvious facts, nothing can pass for reason, but what is confirmed by demonstration; hence illustrations of the nature of those which I am now to lay before you, must be pleasing and simple.

And, first, let me remind you, since extravasation in the substance, or on the surfaces of the brain, is the subject which I have undertaken to explain, of the simple incontrovertible data on which all our reasoning must proceed, of those principles which are now to be put to the test of experience; that there is no part nor organ of the body so exquisite, soft, and delicate in its texture as the brain, which is maintained in its entireness, and supported under the intense circulation of its blood only by being encased and supported by the scull: that there are no vessels so tender as those of the brain, so apt to yield before any sudden impulse or unusual action, or so much disposed to give way spontaneously, even while no unusual force acts upon them, when neither the pulse is accelerated, nor the breathing constrained: that there is no department of the circulating system endowed with such irritability. It seems the natural constitution of this organ, that wherever the faculties are extensively excited or exerted, the function of the brain must be supported by a more rapid circulation; and thence, in a fit of passion, excitement mounts upon excitement, the eyes glisten, and the visage is inflamed, the veins swell and the throat seems suffocated; the temples throb, so that every pulse tells upon the ear and upon the brain, till the senses are in confusion, and the person ready to fall down: it is at such a time and under such impulse, that the arteries are apt to give way, sometimes from the mere impulse of the blood, sometimes from natural delicacy or weakness at some particular point, sometimes from diathesis or gradually increasing distension of the vessels, till they are so weakened as to yield to the slightest cause; sometimes, I doubt not, from ulceration or a varicose state of the surface of the brain, the floor of the ventricle or of its choroid plexus, for, in all parts of the body, slight disorders are often slowly and imperceptibly, preparing the way for our dissolution. but such ulcerations or local debility, give no intimation of danger; the destined vessels give way in the brain as suddenly as the heart bursts, and often (though palsy alone sometimes ensues) the extravasation is as fatal as that from the ruptured auricle; if slight, the patient often starts from his seat, cries out with alarm, vomits, is cold, has lost his voice, and is palsied in one side: while on the other hand, if the laceration be wide, and the extravasation extensive, the patient falls down senseless, struggles, foams at the mouth, passes his faeces and

urine involuntarily, and expires. Thus, strait are the limits betwixt the slower and gentler effusion, which ends in palsy or lameness, and the sudden and fatal one ending in violent convulsions: I must speak then at once and almost indiscriminately, of slight palsy, and of sudden death; for of those who die suddenly and unexpectedly in bed, much a greater proportion die by bursting of vessels within the head, than by bursting of the great vessels near the heart.

Nothing can be more interesting to the pathologist than to observe the various degrees of resistance which this system of blood vessels gives to force or impulse, to the violence of a concussion or of a fall, to the hurried circulation produced by bodily struggles, or to the impulse of blood into the arteries of the head, produced by passion, drunkenness, apoplexy, or other causes of disorder. Every unusual impulse of blood towards any organ, tries the strength of its vessels, and betrays the weaker points: In one person, the slightest concusion or hurried circulation will produce haemorrhagies from the nose and confusion of head, and the vessels giving way even under their usual and gentle action, palsy is produced; while in another, the vessels withstand paroxysm after paroxysm, of the most violent excitement, as in the drunkard, whose excesses pass long unpunished, till the organization of the brain is impaired by repeated violence; till its exudations are augmented, its cavities enlarged, its functions, and all the animal motions dependant upon them, ruined; or as in the apoplectic, whose arterial system acts with such energy that general effusion takes place into the cellular substance, with general gorging of the veins, and general pressure of the brain, till every faculty is extinguished, and every principle of motion stopped. Often in the deepest apoplexy, preceded by the most intense arterial action, the blood vessels withstand the impulse, and the patient expires without one blot or speck of extravasation being found in the substance, or on the surface of the brain, or any more halitus than such oppressed circulation, or the natural changes after death, may account for.

The dissector, well acquainted with the operations of the preparation room, is more familiar with reasoning of this nature; to him the accidents which happen every moment, and interrupt the works of his own hands, explain what will happen when the arteries of the brain are forced by a rapid circulation: what he sees in the dead body is not a mere argument and analogy, but a demonstration of what will happen in the living; and he inquires and reasons about the cause of his good or ill success in injecting the vessels of the dead body, as the physician inquires or should inquire, into the causes of like extravasations in the living system. The dissector while he injects the arteries of the head, and pushes the fluid onwards with a

steady and gentle force, so as to insinuate it through all their channels, distinguishes, by an elastic resistance, whether the injection moves along the vessels, is retained within them by the strength of their coats, whether they are tense, full, and still entire. Sometimes having injected with a force, almost overpowering the elasticity of the arteries, and having advanced to the very limits of what their strength can bear, some of the delicate extremities give way; and he finds among the flesh of the muscles, or in the cellular substance of the glands, or within the brain, upon dissecting it, small extravasations, such as might be compared with ecchymosis in the living body. When the brain especially is thus injected with wax, its tender texture often gives way, and the cerebral substance being dissolved by putrification, washed away by frequent ablution, and the vessels alone left like the branches of a tree, clots of the injected wax are found hanging from their extremities, importing the bursting of the extreme vessels, and representing such clots of extravasated blood as often are found in the living body, and more frequently in the brain than in any other part. Sometimes, at some weaker point, a large vessel gives way under the force of the syringe, and the operator is conscious the resistance is gone, that the injection has failed, that he cannot by pushing his injection fill a system of vessels of which one branch has given way; the resistance being gone at one point, the pressure upon all the other parts instantly ceases.

In the living body, as in the dead, the soundest system of vessels, urged beyond a certain degree, must give way. In the living body, the propelling power is regulated, the vessels are endowed with very different powers of resistance from the mere elasticity of dead matter: the blood of the veins is flowing onwards, in the living body, to the heart in a continued stream, so that the impulse of the arteries is little opposed, and no rude or foreign power is applied to distend and burst them: impulse and resistance are balanced, and yet the vessels give way in the living body as in the dead. "Always," says Walther, "in those who die slowly of apoplexy, we have found extravasation of blood*." There is then a degree of violence which the vessels of the brain never are able to withstand; and every impulse within this degree, especially when actually approaching to it, is full of danger.

In the living, as in the dead body, the bursting of any smaller vessel secures from farther violence the whole system to which it belongs: the gushing of blood from the mouth and nostrils, after falls and concussions of the head, is thence

* In cerebro omnium tarda apoplexia necatorum hominum, post mortem semper sanguinem invenimus extravasatam, § 64.

esteemed no unpropitious sign; and in febrile or apoplectic impulses, in constitutional headaches, vertigo, and determination to the brain, haemorrhagy, from the nostrils, is accounted critical, and indeed it is so, by saving the brain from any strain upon its circulation: Hoffman accordingly found advantage in "exciting artificial haemorrhagy from the nose, by thrusting pins or quills up the nostrils till the blood flowed in a stream*."

In the living body as in the dead, extravasation happens from the very slightest as well as from the most violent causes; from a blow, there is a suggillation of the skin, which becomes black in a few moments, and continues green and discoloured for weeks; from pulling of the hair arises aneurism of the arteries of the scalp, or, in other terms, such effusions of blood as cannot be reabsorbed, and which even destroy the scull: from the severity of a cough, I have often seen sudden and compleat extravasation under the skin of the face, (especially under the looser skin of the eye-lids, or parts under the eyes,) not only discolouring, but raising and thickening it; raising it often in the form of flat broad blotches or little tumors, such as might be covered with the point of the thumb, and perfectly black. From the violence and struggle of hysterical or convulsive paroxysms, we see the face livid with extravasation, which continues in spots and blotches; and, in yellow fever, the cutaneous extravasations forms streaks down the cheeks, neck, and shoulders. In apoplectic and convulsive disorders, as in the young man who fell down in the tennis-court, the extravasation is not limited to the delicate substance of the brain, but the same impulse produces an external suffusion of blood which extends over the neck and shoulders, so that the appearance of the corps is shocking†. Much of the swelling and of the deep colour, in the worst and most dangerous species of inflammation, proceeds from extravasation, especially under the skin, in the glands, and among the cellular substance of the viscera. Tumors of the liver and of the spleen produced by febrile paroxysm, and especially accompanying malignant quartans, are mere extravasations; and the liver, and more especially the spleen, swelled to an enormous degree, are found to be as it were sacs of putrid and extravasated blood. Spots and blotches of extravasation discolour the inflamed bowels when verging towards gangrene. This yielding of the minuter vessels is the cause of much of the destruction, and of many of the most conspicuous phenomena in diseases of all

* "Donec tandem sanguis ex variam venulis ad uncias circiter vi; ope pennulae intrusae, in eo nimirum latere ubi dolor consistebat, fuerit coocatus."—*Hoffman.*

† Vide page 563.

parts of the body; but extravasation which injures only some unessential part in any of the other viscera is fatal when happening in the brain.

Extravasation is produced in the brain by every cause, whether external violence or excited action, which can produce it in any part of the body, and to such causes the head is in a most peculiar manner exposed. By the concussion of a shock, a fall, or the blow of an obtuse and heavy body, blood bursts from the nostrils, mouth, and ears: Is it any wonder, if the concussion, which thus universally bursts the delicate external vessels of the head, causes, at the same moment, extravasation in the more delicate substance and finer vessels of the brain? From natural weakness, the vessels of the brain often give way suddenly even under the natural and healthy action, nor are we aware of any danger till some tragical scene betrays such partial weakness, then the brain, being inundated with blood, the patient suddenly expires. Nor are we always aware of the danger even when the bursting of the vessels is a consequence not of external violence but of arterial action, for a slight impulse will produce danger, when conjoined with any local weakness: the arterial excitement, which bursts the weaker part, is often obscure and transitory, so that we hardly remark the flushed cheek or giddy feeling which precedes the stroke; thence predisposition to apoplexy, habitual headaches, vertigo, hemicrania, and all the slighter affections of the head, are frequent precursors of the paralytic stroke; and excess in wine, paroxysms of passion, and indulgence in venery are never void of danger.

In the brain, where every the slightest touch of extravasation does harm, where every general effusion is fatal, the effects must vary infinitely according to the size of the vessels which have given way, the rapid or slow manner in which the blood is poured out, the part of the brain in which the extravasation happens, and a thousand circumstances, a few only of which come within the limited sphere of our observation.

Sometimes, from an arterial action hardly sensible to the patient, a slighter effusion, an ecchymosis, a gradual oozing out of blood takes place, so slowly, and from such slender vessels, that it is easily repressed by the general resistance within the skull; the effusion is such, as may be compared with the small clots, which, after a full and bold injection of the vessels of the brain, are found hanging to their extremities: only a smaller part of the brain is injured, but it is so injured, that irrecoverable palsy ensues: the patient staggers, and is giddy; he thinks to move, but finds that one leg can no longer support him, and that he cannot grasp with his

hands; he falls down, pale, cold, and almost insensible; he has lost his speech; his mouth is distorted, and he is palsied on one side; and he generally vomits. Sometimes the vessels that give way are large, and the extravasation sudden and widely diffused; the patient, as if struck, utters a cry of alarm, falls down, struggles in the most horrible convulsion of one side of the body, while the other is paralysed; is pale and cold; passes his faeces involuntarily; has an oppressed and intercepted pulse; lies for some hours in the deepest apoplectic oppression, and dies. This is not palsy nor apoplexy, but sudden death; and, upon dissecting the head, the blood is found to have burst from some greater artery; to have burst, in various parts, through the medullary substance of the brain; it fills the ventricles, oppresses the surfaces, and inundates the whole cavity of the cranium, so that we hardly know from what point it has originally burst out; but the disaster accounts too plainly for the convulsive struggles which precede death. This is what has been termed Sanguineous Apoplexy *, Haemorrhagia Cerebri, apoplexy in which, upon dissection, blood is found effused in the cavities of the ventricles; while that pure and simple apoplectic state, in which nothing is remarked but veins highly distended with black and half coagulated blood, is named Apoplexy, from ATRABILIS; as if atrabilis, black bile, an imaginary humour, which was supposed to produce one of the imaginary temperaments of the ancients, had entered into the veins of the brain, and poisoned its functions. Sometimes the vessels of the brain are capable of withstanding any degree of concussion, any force of arterial impulse, till the veins are gorged, the cellular substance injected, and deep oppression of the senses, stertorous breathing, slow pulse, and complete apoplexy ensue.

Thus, we perceive that, while in the dead body the unrestrained pressure of an unskilful injector discovers any weak part, and bursts the vessels, there are also in the living body, occasional impulses which the vessels can never withstand: as in the dead body, when the vessels are weak, the slightest pressure of the syringe will burst them, the slightest scintillation of arterial action will burst them in the living; and the cry of alarm which the patient gives, and the convulsion and tumult of a fatal paralytic stroke, is often preceded by a flushing and redness of the cheek, and by a giddiness, so slight as hardly to be perceived.

* "Haemorrhagiae Cerebri appellatione, nos fortem et pernicialem illam *Apoplexiam Sanguineam* comprehendimus quae ab effusione crueris in cerebro ex ruptis ibi, citra violentiam externam, vasculis, oritur," &c. —— *Hoffman, Tom.* iv. *sect.* 1. *cap.* 7.

Carry it ever in your mind, then, that the apoplectic state is a state of unisveral pressure, for vessels injected and gorged with blood operate on every part and particle of the brain: that the paralytic state is a local injury, proceeding from a more gradual and limited effusion of blood: that the general effusion of blood, which, poured out from a larger artery, inundates the brain, has effects nearly similar to those of apoplexy: that while the patient survives such a bursting of a larger vessel, he is entirely oppressed, but more generally convulsed: and remember, also, that the pathognomonic, or distinguishing signs of palsy, are shrunk features, a feeble pulse, hiccup and sickness, that the senses are entire, but the tongue and one side paralysed; while the distinguishing signs of apoplexy are, a flushed face, oppressed senses, relaxed limbs, laborious breathing, and a slow but often a heavy and throbbing pulse, and the sphincters relaxed. If the vessels give way early in the disease, the action being less violent at the time of their bursting, the whole system of vessels is saved, not by the extent of this haemorrhagia cerebri, but by the deadening effects of this accident on the brain and on the circulation; and thus the life is preserved, by that catastrophe, which paralysis half the body: But if the vessels withstand the impulse long, the apoplectic impulse continues, the arteries work the blood forward into the veins, the substance of the brain becomes turgid, the apoplectic stupor is compleat, and if the vessels then yield, they burst with a wider laceration, and the death is sudden and convulsed.

What symptoms should we look for, when the arteries of the brain give way? Expressly those which we usually witness, viz. the outcry as of one shot, and an indescribable confusion, or the struggles of an animal under those cruel and merciless experiments which I have already described. In effusions, sudden and violent, the extravasation bursting through the substance, or spreading widely over the surfaces of the brain, the cry of alarm and the fall are sudden, the contortions dreadful, and the death epileptic; but when the blood is slowly insinuated, from a breach of slender and extreme vessels, into the substance of the brain, the patient often does not thus fall down all at once pale, alarmed, and powerless, without utterance or capability of motion; but feels his hand powerless that it cannot grasp, his thigh benumbed, but in no unusual degree, his words interrupted in a manner more ludricrous than alarming; his friends or servants observe his condition before he is aware of it; he attempts to rise from table, before he is conscious that he is powerless, and he falls down, because he expected the stricken limb to support the weight of the body. How delicate must the substance of the brain be,

since it allows so insensible an exudation and is ruined by so slight a one? How natural that every greater shock, or more violent impulse of arterial blood, should force such vessels to yield? How infinite the variety produced by the various degrees of effusion, in parts of the brain which give way?

Let us not say, what avails it to know the varieties of a cause which leads to incurable palsy, or inevitable death? It may avail us much, a knowledge of a physical fact can never be unimportant: the establishing it as a truth, that certain symptoms follow certain derangements, that particular phenomena follow what are named causes, that by destruction of part of an organ, or of the whole, certain properties of mind and body are utterly abolished, can never be unimportant: such facts, well and experimentally proved, lays the ground of many interesting analogies; were our inquiries to stop wherever practical applications fail to reward, or seem to close upon our labours, we should walk our round of speculation within narrow limits. If this disorder of the main organ of feeling and motion is one which cannot be repaired, yet it is something to know how it is affected; to know precisely and truly, when our friend has fallen down powerless, what has happened; to foresee danger, and to cure predisposition. Palsy is named debility; and we have all of us an indistinct idea, that grief, fear, despair, poverty, imprisonment, and persecution, or any long continued depression of mind, will produce palsy: it is marked down as chief of the class DEBILITATES by Sauvages; and unfortunately all the prejudices of our senses confirm this fatal error. The patient who falls down, pale, cold, convulsed, with a trembling pulse, and half the body palsied, is debilitated; it cannot be denied. In this debility tonics are given inwardly, and stimulants, as stimulant oils, blisters, hot fomentations, are applied to the part: the practice is good, that too cannot be denied, the fact is true, but the inference is dreadful; for whereever the sames timulants and tonics are given, in the moment of the paralytic stroke, a slighter palsy may be hurried on to an effusion of blood which will immediately produce convulsion; or given in the case of apoplexy, the apoplectic impulse, though slight and perhaps curable, may, by a slight error, be made to end immediately in death. In palsy and apoplexy the impulse is one; the precautions are the same. Palsy is a bursting of the vessels, as little foreseen and as purely accidental, as the bursting of the auricle of the heart: it is a bursting of the vessels of the head, accidental or natural, that is to say, preceded by latent, or by obvious causes. It is always violent, being an effect of a shock, or of an arterial impulse. Debility! might

save us from such a disease, could never cause it: debility artificially produced, or in other terms moderated action, is the true prevention.

We have reduced to plain intelligible principles, a disease which has been ill understood when named and classed among the debilities; and I shall next proceed to lay before you a few of the phenomena, medical and pathological, of this disease. While the symptoms vary according to the degree and manner, the rapidity or the place of the effusion, it cannot be easy to give a just picture of the paralytic stroke, it would be wrong to give an uniform one. When the blood moved by some dangerous, though hardly preceptible impulse, or bursting through some more delicate or weakened part, oozes out and is subtilely and slowly injected into the substance of the brain, the patient feels neither pain, alarm, nor vertigo, but is palsied before he is aware, and his domestics or friends first observe his lameness: he is not sickened as in the more sudden stroke; he does not vomit as when the brain suffers a more violent and sudden injury; perhaps he is walking with his friends in an evening after the heat of an oppressive and sultry day, and they remark him trailing one leg or walking in a feeble tottering and unusual manner *. When a child is struck, the parents often observe it to rise and fall down again, as if in play; nor apprehend danger till they find one leg lame and the fingers of the corresponding hand crooked and bent into the palm †. The master of a family feels himself after supper

* In this and every description I am careful, without the formality of a narrative or case, to express the actual circumstances of such accidents as I have witnessed in practice.

* We see sometimes the effusion taking place very gradually in the brain, even of a child. A fine boy, of three years and a half old, strong, fleshy, and of a ruddy complexion, in the best health and spirits, in habit of body remarkably full, lively, playful, and rambling, was remarked for about a week by his parents to be strangely changed; he babbled, and no longer spoke as usual, neither easily nor intelligibly, but still ran about with his little play-fellows. On the 5th day, on a Saturday's evening, the mother suddenly observed him rolling in the floor, in an uncouth manner; but he got up again; moved about a little in a ludicrous fashion, fell down again from time to time, and rolled so oddly on the floor, that she could not imagine whether the child was but in a playful mood, or whether, as she found, he had actually lost the power of one side. She took him upon her knee, stripped him, handled every limb with all the anxiety of a mother, but found nothing apparently wrong in the limb, nothing to account for his falling and rolling in the floor; but she found the left arm cold and powerless; the hand flattened and dead like; the thumb fallen down into the palm of the hand; the fingers crooked at the points, and his little hand benumbed and entirely powerless.

With grieved and anxious thoughts she put him to bed, and next morning when she went to look to the child, when she took him up and set him on her knee, she found that he could not stand; his lit-

somewhat lame, as if he had been long in a crooked posture *; his servants remark,

tle leg bent under him; he fell always to one side, and was entirely paralytic. The apothecary electrified him, the very worst thing that could have been done; the physician, who was next consulted, gave him an emetic which could not fail to compleat whatever the apothecary left undone. Such are the precious consequences of practising by rote and thinking of prescriptions, before thinking of the disease.

I was called to this child exactly four months after the paralytic stroke. Eight days before I saw him, he had begun to be afflicted with pain in the head which came suddenly; he started up, cried ungovernably as if seized with some excruciating pain. His more violent shrieks endured sometimes for a minute only, but often after a fit of pain he continued to cry; and when asked what ailed him and where he was pained, laid his little hand on his head, or the centre of the right parietal bone, the palsy being of the opposite side. In a few days this pain decreased, the paroxysms became less frequent, and he was more easily appeased; the arm he could move a little, but the fingers continued clinched, the whole side powerless; the leg wasting. I gave orders that he should have frequent calomel purges; that his head be shaved, and the tender scalp bathed with spirits; that a blister be applied on the right parietal bone, the centre of the pain, and that it be converted into a perpetual issue; not to cure his uncurable palsy, but to prevent his death.

By these remedies the pain at the head seemed relieved; but about a month after, he was strangely affected with such a degree apparently of giddiness, that his head nodded forwards with a violent fit of convulsive motion; frequently in the course of the day he was seized with a paroxysm of this nature. He became remarkably costive; and each fit of constipation was succeeded by a diarrhoea which somewhat reduced him, yet he preserved his health; recovered his flesh; his parents flattered themselves, and all who saw him willingly believed that he might recover; when one Sunday's evening, about six months after he was put under my care, the paralytic side became all at once dreadfully convulsed; the arm and limb were protruded with a fixed spasmodic rigidity; the paroxysm of spasm or convulsion continued five minutes or more, and returned incessantly till Monday evening, when he expired calmly without a struggle or a sigh.

* *Mense Septembr.* 1677, post coenam non immodicam observavit ipse se claudicare, domestici viderunt ipsum pedem trahere, tum quoque brachium dextrum imbecillius animadvertebatur: somnolentus erat, horâ 9. lectum petiit, nihil minùs quàm de Apoplexia cogitans. Mane horâ 3. expergefactus surrexit micturus et nisi sustentatus fuisset, cecidisset, vomuit, in lectum repositus rursus bis vomuit, sensus internos amisit, loquebatur inarticulatè; compellatus audivit et alloquentes intuitus est; non tamen ad interrogata respondit: respiravit sine aliqua molestia aut stertore. Vesperi adstantes agnovit, loquebatur articulatè, at verba non succedebant ad nutum, diebus sequentibus sensim vires recuperavit; at observabatur memoriae insignis hallucinatio, adeo ut narrationem quandam occiperet, illam tamen pertexere nequiit ob verborum congruorum defectum. Quarta septimana templum adiit, praeter textum nullius doctrinae recordabatur. NB. Die ab insultu sexto incedere valuit, verùm manui tardiùs robur pristinum rediit, diu cultrum firmiter tenere nequiit, nec scribere valuit, et ad-

as he goes to his bed-room, that he drags one leg; before he has got into bed, he is sensible that the arm also is powerless or benumbed; his sleep is deep and apoplectic. At midnight, in getting up to make water, he is entirly paralytic; would fall if not supported; and when laid in bed, vomits, loses his recollection and his senses; speaks inarticulately or only tries to speak, and indicates his assent to whatever is said to him by signs and nods. But in the course of the following day, he gradually recovers, speaks articulately, moves his arm, begins in a few days to walk, but moving the injured leg, as if spasmodically. In a few weeks he is able again, though slowly, to write and to use the palsied arm at table, but always awkwardly. During this convalescence, his memory seems weak, and his reason in some degree affected, and at his best, and after an interval of months or years, the manifest lameness and starting of the leg, the slight distortion of the features, the stiffness and oblique carriage of that side of the body, are conspicuous. Thus, do we perceive the slow progress of an internal effusion of blood, and its progressive effects on the senses, and the muscular power, we are sensible that successive effusions produce perceptible stages or paroxysms in the paralytic stroke, and that the judicious treatment betwixt night and morning, betwixt the first and second internal haemorrhagy, decides the future condition of the patient.

But often even where grief and fever have brought on a tremulous motion of the limbs; when the loss of a child and any continued agitation of mind have brought on a vertiginous complaint, and disordered the circulation within the brain; when from any circumstance of the patient's habit, we should expect the effusion to happen slowly, it really happens suddenly, and is accompanied with a cry of alarm. "A clergyman, 48 years of age, had, about six years before the period of being struck with palsy, been greatly alarmed and shocked at the sight of a suicide: his hand had been in the dark contaminated with the saliva of this unhappy person, whence he conceived such a horror, that he was struck with a sort of

hucdum nonnisi lentè literas pingit, causans praecipue indicem et medium manûs affectae. Curabatur *pil. cephal. aq. cephal. Pulv. et Electuario cephal.* *Nulla* adhibita fuerunt *vesicatoria, nulla V. S. nulli clyster, Externè spiritus, inunctiones, Balsam. cephal.*

Die 1. *April* 1678. *Ipsum cum Excell. D.* D. *Joh. Henrico Hegnero conveni in Trülliken.* Ab insultu apoplectico hucusque debilitatem quandam capitis patitur, quae leipothymiam minatur, nunquam tamen in leypothymiam desiit, quandoque debilitas haec vertiginem quandam minatur, nunquam tamen vel gyrantem vel titubantem expertus est. Cum hac capitis debilitate conjuncta est obtusio quaedam, &c. &c.—*Wepfer, page* 773.

vertigo, a pain in the head, and a want of power in the left leg, which was for long agitated by a sort of convulsive trembling during sleep. At the end of six years, and after severe grief for the loss of an only child, one morning in school, while occupied in the duties of it, he felt all at once a titillation of the fauces, with sickness, a sort of pressure at the stomach, and propensity to vomit: he suddenly cried out that something dreadful was coming upon him, ran to his seat, but fell from it to the ground senseless, and lay an hour in that condition; and, upon recovering his senses, found himself palsied on his left side. From 10 in the morning till 10 at night, he continued deprived of speech, feeling a sort of obstruction in the throat which he intimated to the byestanders by nods and signs: he could not swallow, and the throat was swelled: about 10, his speech returned upon drinking a little wine: in the morning blood, and even grumous blood, flowed from the throat to the amount of six ounces; upon which he felt as if some mechanical obstruction was removed from his throat, so that his speech was restored: for some days, blood continued occasionally to be thus discharged, and in a few weeks he was recovered *".

This cry of alarm is more frequent in those lacerations of the internal vessels which are suddenly fatal. The vertigo and confusion of head, the fainting and falling down,

* *Rev. D. Joh. H.* staturae justae, carnosus mediocriter, colore fuscus: 48 annor. Ante 6 *annos terrorem gravem perpessus est cum horrore propter Autocheirum; ab illo tempore tremorem quendam maxime in sinistro brachio et pede; nam in obscuro penduli spuma madefecerat manum sinistram;* accessit etiam *vertigo quaedam et dolor* quidam, et impotentia in sinistro pede: diu noctu quoque valde in somno artus concutiebat. Anteâ nihil prorsus vel tremoris vel vertiginis passus est. Dum 14 annor. erat, è lecto lapsus brachium sinistrum et pedem fregit: verùm ab illo tempore nihil sinistri passus est, sed robustus erat ac studia prosequi potuit feliciter, ac *apud Exteros* studiorum causâ sanus vixit. *Die* 25. *Nov.* 1671, manè jejuno stomacho horâ circiter ante prandium, dum *in Schola* suae vocationi vacabat, praegresso moerore gravi ob filioli unici obitum, sensit titillationem in faucibus cum nausea aliqua et pressione et stimulo circa praecordia, et irritatione ad vomitum: *mox exclamavit sibi periculum imminere aliquod*, properavit ad sedile, inde verò in terram praecipitatus per integram horam omnium ignarus mansit: ad se rediens in sinistro latere paralyticus fuit: ab hora 10. antemeridiana ad 10. noctis loqui nequibat, sensit obstaculum in collo, quod nutibus indigitavit adstantibus: circa 10. loquela rediit potu pauxilli vini. N. B. Ante 10mam noctis liquida deglutire nequiit, et collum inflatum erat. *Die* 26. *Nov.* manè sanguis ex faucibus et naribus ad unc. vi. isque grumosus etiam emanavit, sanguine profusus sensit sibi quasi clavum ex faucibus eductum fuisse, unde liberius loqui valuit. Sequentibus diebus adhuc aliquoties sanguinem ex faucibus et naribus excrevit. In paroxysmo reficiebatur *spir. ceras. nigr.* sumsit quoque *pilul. cephalic.* Sic sensim convaluit. Post 5. septimanam conciona-tus est.

the pale visage and fluttering pulse, the hiccup, sickness, and puking, the distortion of the mouth, the imperfect articulation from paralysis of the tongue, the palsy of the limbs of one side preceded by a numbness and heaviness of the thigh, and a creeping feeling in the arm, are the chief symptoms; nor is the numbness and immoveable feeling of the arm or leg a transitory feeling, but so impressive, that the arm feels like a wooden one, or as if it were actually gone. Witness the very singular case, related by Wepfer, of " a gentleman who was asthmatic and vertiginous, who, when his breath was hurried by quick walking, was obliged to stop, who felt, along with the confusion of head, a breath, as it were, or aura, alarming and sudden, running up to the head and down to the fingers ends. One morning, when prepared for a long walk to Horn, he was, just as he was about to set out, struck down speechless and paralytic: being in a little while recovered, he missed his arm, and complained grievously that he had lost it; and finding his wife's by his side, laid forcible hold thereon, and would not let it go; he said it was his arm, and believed it to be verily " bone of his bone, and flesh of his flesh *".

How little sensibility there is in the brain, must be presumed, from such frequent laceration of its substance and such effusions of blood as might well disorder any part of the animal frame, unaccompanied with pain even when the patient utters this cry of alarm: there is no pain, although the patient all along retains his reason and general feeling from the first intimation of the paralytic stroke to its final close. " The patient sits down at table in perfect health, he is struck with the palsy, he is under the influence of a local injury of the brain, before he has swallowed a morsel, or tasted wine, before any thing could hurt, and while nothing as yet alarms, while he is free from headache, vertigo, or any sensible disorder, any thing that could lessen his sense of pain. In carving, he feels that he cannot handle his fork: after a little, that he cannot grasp nor hold: rising from table, his left leg is immoveable and powerless: moving forward, he falls, if not supported:

* *Generosus Dominus Joh. Jacob Shenck de Stauffenberg*, qui pridem conquerebatur de quodam asthmate, quod inter *obambulandum obveniebat, quo intercipiebatur aliquantulum spiritus*, ut subsistere cogeretur, hinc instar aurae quidpiam ad caput non sine perturbatione, *imò ad extremos digitos vergebat.* Idem Nephritidi admodum obnoxius fuit et plures calculos excrevit. Vertiginis quoque non expers erat. Subinde somno pomeridiano indulsit. *Circa finem Maii aut principium Jun.* 1669, mane cum ad iter procinctus esset *in arce Horn* subitò corruit, hemiplegia lateris sinistri correptus cum aphonia: postquam refocillatus ad se rediit, loqui coepit et conquerebatur unice se brachium sinistrum amisisse, et cum famulus accessisset dextrâ validissime ipsius brachium apprehendit, et hoc suum esse exclamavit, et ne surriperetur, firmiter tenuit.—*Wepfer.*

helped by his friends, he stands and staggers along, but dragging the limb, and his speech is interrupted: placed on horseback, he reclines to one side: the palsy, with indigestion, vertigo, dullness of hearing, irrascibility of disposition, and defect of memory, continue for life *. But through all this process of effusion or of ecchymosis, of blood insinuated and subtilely injected into the substance of the brain, or of sudden palsy, and falling down, from greater laceration of the vessels through all that period in which the senses, and, in some degree, the health, are gradually restored, there is no intimation of pain. The scream which follows the paralytic stroke is alarm, confusion, every thing but pain; and when this symptom is conspicuous, the effusion is usually great, and the event fatal. Sometimes it would appear that the brain in general begins to suffer in its structure, that a particular part is weakened, and a partial and slight effusion precedes often for many months, or even for years, the fatal bursting: The patient, after a first injury, shuffles in his gait, is enfeebled in body, is imbecile in his memory and judgment; and at last, some vessel giving way, suddenly the head falls over upon one shoulder, half of the body is palsied, the face is pale, and the pulse fluttering; and within a few hours he expires. †.

* *Anno* 1670, *die* 19. *Jun.* dum mensae assidet, antequam vel quicquam bibisset, quod nocere potuisset, in prandio nulla praevia vertigine aut cephalalgia, dum cibos incidere conatur, animadvertit se furcillam sinistrâ manu tenere non posse, et postmodum quicquid manu sinistrâ apprehendere conabatur, elapsum protinus fuit; surgens è mensa pedi sinistro vix insistere potuit, et nisi sustentatus fuisset, in terram prostratus fuisset, suffultus stetit et obambulavit; sed nutante pede, non autem trahebat pedem: minus quoque expeditè loquebatur. Domum properans equo insidens inclinabat versus latus dextrum, nec sedere se in equo ipse animadvertit prout consueverat. Primis diebus morbum neglexit, obambulavit, equitavit, postquam appetitus quoque deficere coepit manente apprehensione infirmâ ac loquelae impedimento; accedente etiam dolore in colli sinistrâ parte circa musculum mastoideum et in lumbis, *medicamenta* petiit.

† A woman, of seventy years of age, had for many months declined in her memory; nor did she always see objects, when placed in a certain position; and *as she walked, scarce raised her feet from the ground.* She, having been seized *a year before with a sudden disorder of her head, had, by good fortune, immediately recovered;* but now she fell down suddenly, as she was eating; and became paralytic on the whole left side of her body, and in her right arm. Her respiration was altogether natural, and nearly so the colour of her face, which in her was pale, nor did any convulsions appear; but *her head fell just like that of a dead person;* nor did she give any sign of understanding or feeling, unless that when an incision was made into the jugular vein, she, in some measure, contracted herself. She lived nine hours. *The ventricles of the brain were found to be filled with a fluid blood,* and the right was very much eroded, as well about the external margin of the corpus striatum, as of the tha-

"A noble lady, little predisposed to disease, unless it was by profuse menstruation, and a degree of dyspnoea, supped with her sister and friends, was in health and spirits; and about eleven in the morning, rising, while alone, from her couch, she went first to the stair, then to the passage, to take some linens from a chest, and while in the act of doing so, she felt the stroke, and called loudly to the servant maid, who heard her last words, "Good heavens, what has come over me!" Her maid came just in time to catch her and prevent her falling; she placed her on a chair: instantly her senses failed, her face and hands were livid, and cold as ice; cold sweat bedewed her neck and limbs; her right side was palsied; her eyes were turned up, fixed, and motionless; her pulse quick, weak, and fluttering; her breathing without stertor; her mouth filled with foam; placed upright, she remained so: I found her, (says Wepfer), when I came, without sense or motion; and while the apothecary was gone for medicines, the slight remains of life gradually vanished; her breath went and came at longer intervals; the pulse became obscure; and in less than half an hour she expired *."

lamus nervi optici; but the left about the thalamus alone, and that slightly. The plexus choroides could scarcely be observed. The other parts were all sound.—*Morgagni*, § 13.

A man of 56 years of age, struck with apoplexy, was, in the course of six hours, convulsed and distorted in all the right side, but especially the arm and leg were affected, while the left side lay quite paralytic and powerless. He did not speak, but continually emitted a copious viscid mucus from the mouth. Next day, after a sense of great commotion in the breast, he expired as if suffocated The brain was sound, but the right ventricle was full of a bloody extravasation, somewhat mixed, and variegated as if with pus. The floor of the ventricle was hallowed out, and eroded, while in the left ventricle every thing seemed sound.

From his wife we learned, after the dissection, that some years before, he had been subject to giddiness; that for many days before his death, he had complained of pain and heaviness of the head; and that blood had burst *from his nostrils the day preceding his death.*—Baglivi.

* "De variis confabulabantur atque ipsamet cum suis nihil nisi optima quaeque de bona valetudine sibi pollicebatur. Post 11 antemeridianam, dum *sola erat, surrexit, è cubili in hypocaustum, indeque ad porticulam sine fulcro ivit*, petitura aliquid linteaminum mundorum è cista, verum vix opus aggressa erat, debilitatem praesentiens hypocaustum repetiit, *ancillam inclamavit ac ultimum hoc effata est, O Jesu quid mihi evenit! vix ab ancilla à casu detineri ac in vicinum scamnum collocari potuit, mox omnes sensus et motum dextri lateris amisit, facies et manus livescebant et gelu frigidiores erant: sudor frigidus per faciem, collum et artus largissime fluebat; advolans omnes sensus abolitos comperi: pila hysterica*, quae ad manus erat, naribus admota, brachium sinistrum movit; dextrum nunquam utcunque digitos complicatos fortissime compresserim: *pupilla oculorum ambo immobilia*, obtutus fixus, oculi splendidi, nullum visus sig-

We need no dissection, in such a case, to explain what had happened; occular testimony could hardly add to the assurance we have, from the circumstances of the case, that the brain (it signifies little from what vessels) was oppressed with blood: we might almost say, with the profane knight, "we know it, aye, as well as he that made it:" we also know, that it is but the various degrees of rapidity, with which such blood is effused, that makes the difference of cold pale visage, and fluttering pulse, and the most horrible convulsive struggles. Whenever, the one side being palsied, the other is convulsed, and the patient lies struggling, we may boldly prognosticate and affirm, that the extravasation is great, and the accident fatal *: It is only when the blood has flowed suddenly, and from the greatest vessels, that the pain, the convulsion, the trembling like that of a creature under some cruel experiment, is observed, as in "a young man, of two and twenty years of

num praebebant, Immoti semper. Pulsus frequens, celer, debilis: respiratio aequalis absque stertore; spumâ subinde os opplebatur: *erecta in lectum humi stratum in eodem statu mansit:* cum neutri pedum insistere valuisset, instar trunci misere trahebatur. Dum *Chirurgus* accersebatur, ac *medicamenta ex Pharmacopolio* afferebantur, motus omnis periit, pulsus evanuit, *respiratio intermisit, rediitque per longiora intervalla sine stertore ut valida pectoris dilatatione ac citius, quam dimidia hora absolvebatur, vivere desiit.—Wepfer*, p. 668.

If the evidence of the effusion of blood be wanting in this narrative by Wepfer, it is shortly and unequivocally marked in a similar narrative by Morgagni, § 19.

"A man of fifty-eight years of age, of a good natural constitution, but much given to the use of tobacco, fell down suddenly, as he buckled his shoes. His speech was *entirely lost; he had no motion. His face was pale, then grew somewhat yellow, as in a jaundice, and presently grew pale again: some little drops of saliva flowed out of his mouth. In a quarter of an hour he died.* His belly being opened, every thing was sound; and in the thorax also, although the inferior part of the lungs adhered to the diaphragm and back, and both the lobes were very red with blood, especially the right, which was so turgid therewith, that on a slight laceration a great quantity burst forth. *But in the cranium, a good quantity of coagulated blood was found, under the pia mater,* on the anterior convexity of the brain, particularly on the right side. In the right also, and the left ventricle of the cerebrum, a little blood was seen, with a slight coagulum; but the plexus choroides, although it was sound, might seem to have been affected with an inflammation.

* "An old man (says Morgagni, § 17) of seventy years of age, fell suddenly down to the ground, having lost the power of moving and feeling on the left side; and the right being considerably agitated by convulsive motions: his face was red. In less than twenty-four hours he died. His scull being opened, coagulated blood was found between the right posterior lobe of the brain, and the dura mater; and a kind of concreted serum betwixt the sanguiferous vessels of the pia mater, which being cut through a little serum flowed out.

age, strong and healthy, undaunted by any kind of labour, who, having run very fast after his master's chariot, in the depth of winter, and snow then falling on the ground, was thrown into a profuse sweat at the time, and neglected to change his clothes: Next morning, upon leaping out of bed, he fell down three times headlong, had lost all sense, and being lifted up, complained of a cruel deep-seated pain in the head, especially in the occiput, and was soon after affected with fever, lassitude, and universal pains: His disorder tended to a sort of lethargy; notwithstanding bleeding and cuppings, he was, on the morning, taken suddenly speechless, and lay for an hour immoveable, as in an apoplexy, after which the pain of the occiput was exasperated, and extended to the shoulders and spine, in a most violent manner. On the 9th, being bled in the arm, the symptoms relented for a little, but the apoplectic paroxysm returning, he died.*" This is a case highly interesting, since it seems to comprise, in its various periods, a succession of internal haemorrhages, and proves how little the greatest effusion of blood affects the intellect till it compresses the whole brain: It also proves that the haemorrhagy may be repressed by the general fullness, and the death of the patient be retarded, even where the blood flows from the carotid artery; by this case are we reminded, that every such internal haemorrhagy is an aneurism, but with the peculiar effect of compressing the brain. " The head, the proper seat of the disease, (says Morgagni), was next examined; and where the medulla prolongata goes out from the cranium, grumous blood was found, which had *flowed out from the lacerated trunk of the internal carotid artery*: the ventricles of the brain contained a great quantity of a saltish water; the right and left contained also a portion of condensed blood."

It is necessary that I next unfold to you the causes from which such internal haemorrhages arise, even before I prove to you that they are haemorrhages; for as yet you have no proof that blood is, as I have affirmed, injected into the substance of the brain. Concussion is a frequent cause of such effusion; but by far the most frequent cause is an arterial impulse, or excessive action in the vessels of the brain. Even in cases of concussion, as in that narrrated in the foot note†, the

* Morgagni, p. 20.

† A man of sixty years of age, of a sanguineous temperament, and endowed with a good habit of body, by accident had a fall in walking, and struck his head violently against the ground. Being slightly stupid, his forehead being bruised, and blood gushing out from his nostrils, as also a palsy of the left arm having followed these symptoms, so that neither sense nor motion remain-

marks of arterial impulse, the redness of the face, laborious respiration and quickened pulse, are so conjoined with haemorrhagy of the nose, palsy, and other marks of external and internal bursting of the vessels, that we are left in doubt whether, even in cases of direct violence, the haemorrhage may not be progressive, and whether the excited state of the circulation may not have its share. But the cases in which the excited state of arterial action, and the truly haemorrhagic effusion of blood, at once or at successive impulses, is clearly marked, are very numerous and very interesting. Often the arterial action is slight and transient, the habit being marked only by headaches and vertigo, the actual presence of arterial excitement by slight confusion, and a flushed cheek, while its effects are dreadful, the patient falling down, with the limbs distorted, and the faeces involuntarily discharged*. Such is often the end of those who indulge in wine; sometimes their death is sudden, attended with no sign of palsy, except the involuntary passing of the faeces; but often it is preceded by a marked apoplectic state, as in the young man, a native of Bologna, whose case is narrated by Morgagni in nearly the following words: He was no more than fourteen years of age, and yet excessively abandoned to the drinking of spirituous liquors: the slightest exercise, or sitting by the fire, oc-

ed in it, he was brought into the hospital of Sancta Maria de Vita at Bologna. *He had a full red colour in his face, a laborious respiration, a hard and moderately quick pulse,; but in every other respect there was no preternatural appearance, except the paralysis already spoken of. On the fourth day he was speechless*; on the beginning of the fifth he died. In the belly and chest every thing was natural: the os frontis bore no mark of injury, that the senses could perceive; though a little blood was taken away from between the teguments and bone, which had stagnated there from the contusion. Upon opening the skull, the dura mater shewed only a slight mark of contusion, which did not reach to the pia mater; but in the right ventricle of the brain, *about two ounces of extravasated blood were found concreted:* and the corpus striatum, with a part of the plexus choroides, was so much eroded, that scarce any vestige of it remained.—*Morgagni*, Letter ii. art. 11.

* A man of about sixty years of age, who drank freely of generous wine, though he was frequently used to fall down with a vertigo, was at length, on a certain day, just after dinner, when he seemed to be very well, *except that his cheeks were redder than usual*, found lying dead on the ground, his upper limbs being extremely contracted, and the faeces alvi emitted. The cranium being sawed through, and the dura mater perforated anteriorly, a limpid water burst from betwixt this and the pia: and the pia mater, which was of a palish colour, contained a gelatinous concretion of serum in the interstices of its vessels. In the lateral ventricles, some of the glands of the plexus choroides were so turgid as to equal the largest lentils in magnitude; *and in the right were two grumous concretions of blood.*——*Morgagni*, Letter iii. 22.

casioned in this boy profuse haemorrhages from the nose, without any apparent cause. From brisk and lively, he became stupid and oppressed; and but a few days after this condition was remarked, (though he had conversed in the morning with his friends, and had dined as usual at the general table,) he was found in the afternoon lying flat upon his bed: he had vomited: he was compressing his head powerfully bewixt his hands, as if suffering extreme pain: he was speechless, and soon after motionless. A physician was sent for, by whom he was bled: smelling salts were applied to his nostrils: he seemed to recover a little, but soon relapsed into stupor, signifying his consciousness of what was spoken, or done around him, only by nods: his pulse was low and intermittent; his respiration laborious: there was foam about his mouth: when cupping glasses were applied to his shoulders, he seemed unconscious of what was done; but when applied to the thighs, they gave him pain: he cried out inarticulately, and endeavoured to remove them with his hands: before midnight he expired. "When I cut (says Morgagni) into the integuments of his head, which was the only part I dissected, more blood, and that more black and fluid than usual, was discharged. Only a a few drops of the same kind of blood were found in the sinus of the falx, which was in every other respect empty. In the lateral ventricles, and in the third, some little quantity of serum appeared. But under the cerebellum, the substance of which was more soft than it ought to be, almost in the middle, I found about two spoonfuls of black and concreted blood."

Nothing surely can be more interesting than this case, carrying with it such a variety of practical conclusions; marking so distinctly the predisposition generated by youth, and excess in spirituous liquors; the frequent external haemorrhages relieving the internal vessels at every paroxysm of action produced by heat, exercise, or wine; the internal haemorrhagy at last happening in a moment, and causing sickness and confusion; the lad vomiting, holding his head, and falling soon into a state of stupor; retaining his senses, because the effusion was partial; having no partial palsy of one side, because the effusion was not in one hemisphere, but general over the cerebellum: his fate was decided from the moment of his falling down.

There is not in the records of medicine, a case more melancholy, or marking more distinctly the consequences of successive effusions, than that of the greatest man in our profession in that age in which he lived, I mean the celebrated Malphigi. "Marcellus Malphigius died in the sixty-sixth year of his age: he was of the middle stature, his body inclining to corpulence, his habit adust: he had in consequence of intense application of mind been

subject for many years to vomiting and fits of the bile, and when these paroxysms abated, palpitations of the heart ensued. It was upon the 25th of July in the year 1694, after long continued melancholy, anxieties, and disorder of mind, that he was about mid-day struck with apoplexy, palsy of the right side of the body, and distortion of the eye and mouth. Various remedies were used, especially bleeding in the arm, cupping and scarification of the shoulder, sternutatory powders, synapisms to the soles of the feet, with such other spirituous and stimulant medicines as are esteemed in this disease. By the force of these remedies, after four days of great suffering from disorder in the head, he seemed to recover from this hemipligia."

"But such recoveries are rarely perfect, (says Baglivi), and in this truly great man we had the unhappiness to find his memory and faculties of mind impaired: he cried like a very child from the slightest imaginary cause, and was affected with indigestion, loss of appetite, and convulsive motions, in which desolate condition he lingered on from July to November, when the confusion of head and vertigo having increased for some days, he was once more struck with apoplexy, and in a few hours expired."

DISSECTION.

"His heart was greatly enlarged, and the walls especially of the left ventricle thickened to two inches; the kidneys, and especially the pelvis, were enlarged, and the ureters so dilated, that before his death, while he laboured under calculous complaints, he could sensibly feel the stones pass down along the ureter into the bladder, whence they were immediately expelled, and a small stone was found in the bladder, which was known to have fallen down there four days before the last attack. Upon opening the head, and cutting into the right ventricle of the brain, there was found no less than two pounds of black and grumous blood; while in the left ventricle was found only an ounce and a half of yellowish serum. The vessels of the brain were varicose, and the dura mater adhered with uncommon firmness to the scull. These are all the circumstances I observed in dissecting the body of this learned man." (Signed) GEORG. BAGLIVI.

The severe studies exciting and disordering the circulation of the brain; the predisposition marked by vomiting and bilious attacks, *i. e.* fits of headache and sickness; the paralytic stroke sudden, complete, and accompanied with apoplectic symp-

toms; the partial recovery, but with continued indigestion, loss of appetite and convulsive motions; the increasing vertigo and confusion of head; and the last final effusion of no less than two pounds of grumous blood, forms a most interesting scene *.

The case of Mathias Stoker, related by Wepfer, is also interesting in the last degree, as marking the slow and subtile insinuation of the blood, the palsy gently and slowly increasing, the insensibility of the brain, the slight degree in which the senses and reason are affected, by the injection of blood into its substance, and the dreadful convulsions which close the scene. "This man was a potter, of good stature, fleshy, of a ruddy complexion, and just thirty years of age. He had laboured day and night in the sultry heat of summer, in the month of May, modelling a ponderous earthen jar fit to hold 30 pounds. Towards afternoon, he was struck with hemiplighia, so that he could neither turn the wheel with his foot, nor model the clay with his hands. He could walk indeed, and he could raise his hand to his head, but his hand seemed to himself a leather or a wooden one, and his foot he trailed after him. No predisposition to the palsy had he ever observed, except that for half a year he had, after any drinking bout, felt intense headache.

"From the moment of this attack, he had, especially upon lying down, a dreadful pain in the head. Though he could mark no particular part as the seat of his pain, but said that he was universally and equally affected, yet was he particularly observed to rub the right side of his head with his hand: he had continual irritations, and frequent vomiting of food, bile, and mucus, and he threw up also many worms: he frequently fainted, sometimes while in bed, but more frequently when having taken a purge, he had got up, and sat long at stool; and when he fainted, he became deadly pale and cold, and breathed loud and hoarse; his feet were continually cold, so that flannels, heated bricks, &c. could never restore them to warmth. He never rested, so violent and incessant was the pain of his head; if he slept or (slumbered rather) he became delirious, and his face was flushed: his appetites of every kind entirely forsook him, and though thirsty at first, even that natural desire at length left him: his urine was red and flame-coloured; and, from the moment of his being struck with palsy, he never perspired.

"The quack who was first called had bled him, for the patient believed that the omission of his customary bleeding had caused some humour to fall down upon his side.

* I have not Baglivi nor Bonetus by me. I extract this narrative from a voluminous system of notes, which have, in some places, been hastily written; and cannot but wonder if this be true, and almost suspect, that I have put down two *pounds* in place of two *ounces*.

Christopher Simonius being called on the third day, ordered him a doze of purging cephalic pills. He had been costive for three days, and these gave him several stools: again he vomited worms: having used the pills a fourth day, he was manifestly weakened, and fainted when raised from bed. Blisters were now applied to his arms, shoulders, thighs, and feet, which, though they produced large vesications on the upper parts, never affected the lower extremities in the slightest degree. The blisters were made then more acrid, but without effect; and though from four successive glysters he had some relief, it was of short duration; the terrible headache returned. He had a decoction of onions in beef tea given him, on account of the worms, which brought away many, dead, nor did he from that time complain more of tormina in the bowels: he was bled also in the foot, but with very temporary relief. In the space of four weeks, he was greatly reduced: he shut his eyes very close and firm, which he said he did from the intense pain within his head: during the three latter weeks, he lay continually in bed, though during the first week, he was wont to get up often unsupported and alone: having at the end of the fourth week, on the 11th of June, had a stimulant suppository administered on account of constipation, he fainted during the purging which it excited: when he recovered, one leg trembled convulsively; and, in the afternoon, a horrible epilepsy came upon him; his limbs and whole body were distorted and convulsed in a frightful manner: he was especially bent back by a dreadful opisthotonos which, with but slight remissions, lasted three hours; and when this epilepsy ceased, a deep palsy ensued: he lay deprived of sense or motion; nothing could rouse him: what was poured into his mouth, he could not swallow: when he first fell into this stupor, it seemed a natural sleep; but on the following days, he breathed loud and hard: he expired on the 14th of June. The head was the only part we were permitted to open. On the scull-cap being removed, there was seen a purple spot, which we found to be a clot of blood, of the size of half a Dhaler, shining through the dura mater, and there was, distinct from the intumescence of the dura mater, a tumor round, circumscribed, of the size of a wound egg, (the small egg which the hen has when she first begins to lay). The meninges covering this tumor were so delicate, that you could easily push your finger through them into the substance of the brain. The tumor contained a gross black fluid like boiled blood. This tumor had its seat betwixt the convolutions of the brain, in the center of the occiput near the falx, and it rested upon the roof of the ventricle: it seemed to *have a peculiar sac*, and to have distended the sub-

stance of the brain, the brain itself, where it surrounded the tumor, being soft, flaccid, and watery: in the left ventricle was a foul serum like the washings of flesh: in the right side, the brain was sound, and the ventricle natural, nor was there any token of extravasation anywhere within the cranium either of blood or serum; but universally the blood-vessels, going upon the convolutions of the brain, were remarkably turgid with blood."

It oftentimes happens that an individual case, by its very peculiar complexion and circumstances, throws a new light over all the preceding years and most perplexing occurrences of our practice. If ever there was a case of this decided cast, it is the one before us, where the dissolute habits, great stature, and fleshy fullness of the man were such as to imply predisposition, which his headaches after each debauch abundantly proved; where the heat and the laborious occupation he was engaged in at the moment of this accident, shewed what sort of impulse it was, which the vessels of the brain could not resist; where the slow injection of blood into the substance of the brain, brought on, gently and imperceptibly, the paralytic state; where the black and boiled appearance of the blood shewed that it had been for weeks effused; where the form of a sac, surrounding the tumor, shewed, even in the delicate substance of the brain, the effects of inflammation; where the perpetual pain shewed that the brain was actually and truly inflamed; and the universal fullness of the vessels shewed how slight an addition, (for there were no marks of recent effusion,) brought on those dreadful convulsions in which he expired: The size of the tumor proves in a great degree the insensible nature of the brain, in which at first he felt no pain; and entirely proves how little the senses or the reason are affected by partial injuries of its substance.

Observations on the effects of critical haemorrhages and critical days formed the rule of prognostic among the ancient physicians; they observed certain changes to follow certain discharges, or to happen at certain periods, in every febrile disease. The more complicated the sources of conjecture, the surer the prognostic; and our forbodings or our hopes are never so sure as when they are founded on pathology and dissection, on what is likely to happen, or what is actually passing within the organ. We perceive that every various degree of effusion of blood, should give a different prognostic, and have reason to believe, that certain signs indicate those various degrees. First, When the palsy comes on slowly, insensibly, and gradually, we have reason to believe, that the blood is either effused upon the surface of the dura mater where it may remain harmless, (the substance of the brain being inviolate,) and may indeed be animalized or absorbed, (as in cases of blows upon the head,)

then the patient may recover: or, the blood being slowly injected, and in a very limited quantity, into the substance of the brain, the destruction of its substance is so very slight, that the palsy, though irrecoverable, is deep, amounts to a mere awkwardness in using the arm, and a lameness of the leg, but without distortion of features or wasting of the body. In such slow and partial extravasations, it often happens that the tongue recovers; the articulation of words is correct, though usually slow; the patient attains to write with the hand, but continues to move the limb by starts, as if it were moved by springs rather than by muscles under the command of the will. Secondly, When the palsy, in place of approaching thus slowly and gently, comes in the form of a paralytic stroke: when the patient cries out, falls sidelong, vomits, loses the use of his tongue, and remains stupid, staring, speechless, and with one side motionless for a day, we have every reason to fear that the effusion is of some extent, and are certain that the palsy is incurable: Then the patient, with obliquity of the face, faultering of the tongue, crookedness of the fingers, (curved towards the palm like a bird's talons) will forever trail the leg, will have a look of imbecility, with a real defect of memory and reason, eructations, loss of appetite, and wasting of the body. When there is a tremor of the paralysed or of the opposite side with convulsive twitches, however slight, the disease is more desparate; but, if upon falling down, the patient struggles, foams at the mouth, is paralysed on one side, while he is convulsed on the other, or is bent back with universal convulsion, the extravasation is great and sudden, the brain is inundated with blood bursting through its substance or covering all its basis, death is inevitable. Finally, when we perceive a decided tendency in the habit to palsy; when one impulse of blood has caused a slight extravasation and partial paralysis, and the succeeding strokes are attended with convulsions, or even with tremulous motions, there also the effusion is great, and the disease invariably fatal *.

* A man, aged forty years, being liable to a vertigo, from the intemprate use of wine, was seized with an apoplexy about the beginning of February 1703. Being immediately brought into the hospital of St. Mary de Vita, when I was there, as I used to be every morning, he appeared to be already somewhat relieved of himself. The physicians ordered his legs and his feet to be vehemently rubbed, spirit of sal ammoniac to be applied to his nostrils, and even some drops of it in a proper vehicle to be poured into his mouth, and blood to be taken away from his arm. The blood was taken from the left arm, on which side he was most affected with a paralysis. While these things were doing, the man was twice seized with a tremor, began to move his cheeks and his mouth, and to be seemingly more and more affected with palsy; and slight convulsive motions presently ap-

Our chief difficulty remains, the difficulty of conceiving how a haemorrhagic effusion once begun should ever stop, or be any way resisted by the delicate substance of the brain; and it is a difficulty never to be removed, but by proving the fact. We may well and easily conceive how the adhesion of the dura mater to the scull may put limits to that ordinary effusion which arises from a shock or blow, and how even that extravasation which happens between the dura mater and brain might be repressed by the general fullness of the cavity; but that the force urging the vessels should be so great as to make them burst, and yet so gentle as to stop upon the slightest resistance, and form small and limited sacs of extravasation within the substance of the brain, is a thing almost incredible, were it not proved by very many facts. In a case or dissection described, with more than usual accuracy, by Morgagni*, we recognise the proofs of several interesting points of doctrine. First, That a woman, 40 years of age, that age in which the system becomes

peared on the right side, a more violent apoplectic paroxysm returned on the same day, which carried him off about the second hour of the night.

While the head was severed from the body, much blood flowed out, part of which came from the mouth. Then Valsalva said to me, this apoplexy, unless my observations fail me, was brought on by blood injuring the right side of the brain. In mean while, as we took off the common involucra of the cranium, we saw even the smallest blood-vessels of the periosteum to be manifest and distinct: yet we presently saw the small vessels of the meninges still more distended, especially through the left side of the pia mater; where besides, on the top of the hemisphere, there was some extravasated blood, which resembled the blackness of a contusion. But when we came to the lateral ventricles, I admired the truth of Valsalva's prediction. For though there was in the left ventricle some portion of extravasated blood, yet it was what seemed to have flowed there from the right. For in this last mentioned ventricle, there was not only a greater quantity of black and concreted blood, but also a great hiatus from whence it had proceeded, as if any one, with a large blunt knife, had penetrated through the external side of the corpus striatum and thalamus nervi optici, and had turned both of these parts over the fornix and the third ventricle. Other things which relate to the passage of the blood that was discharged from the mouth, you will find sufficiently explained by Valsalva.—*Morgagni, Let.* 3. *Sect.* 16.

* A woman, of forty years of age, and much given to drinking, was seized with an apoplexy. From this she became paralytic in both sides, and was brought into the hospital at Padua, and there she soon died. In her body, by reason of the unseasonable heat of the weather, for it was not yet the middle of March 1740, I scarcely examined any other part, in the hospital, but the head. The scull seemed narrow in its cavity in proportion to the length. There was polypous blood in the falciform sinus. The vessels of the pia mater *were so distended with blood, that the larger ones were almost black; and the smallest made a very beautiful appearance, as if injected with red wax.* The cerebrum and cerebellum were so soft, that the pia mater was easily drawn away from them by the hand. While I *cut here and there into the substance of the brain, not only bloody points and filaments appeared more*

more plethoric, and the menstruation is about to fail, much given to drinking, by which predisposition of the most dangerous tendency is incurred, (since there is both habitual fullness of the vessels and frequent excitement, affecting particularly that department of the circulating system); was struck with apoplexy; after the apoplexy, she became paralytic in both sides: it was soon after the apoplexy had thus terminated in palsy; that she died in the hospital of Bologna. Secondly, It is worthy of observation, that as nothing can be imagined more singular than a palsy of both sides, nothing can be more gratifying than the explanation of such a phenomenon; and in the dissection we find a perfect solution of the difficulty, for *both* sides of the brain were *partially* destroyed. There was found, in dissecting the brain, stringy and coagulated blood in the great longitudinal sinus, an accident neither unnatural nor rare: there was found such a turgescence and dilatation of the vessels, from their trunks down to their minutest branches, that they seemed injected with wax: the bloody points with which the brain, even in its natural state is speckled and dotted, were every where more frequent. These are phenomena inseparable from the apoplectic, and from every inflamed state of the brain; they are indications merely of the active state of its vascular system; but that some of its vessels had burst during the apoplectic impulse, is proved by the next established fact, for there was found in each

frequently than usual up and down, but in the medullary substance of each of the hemispheres a cavity was found. One of these cavities was small; and being situated at the external side of the thalamus of the right optic nerve, was of such a sise and shape, that it would just admit a *very small oval prune.* It was almost closed, unless that it was stuffed up, in some measure, with a brown gluten, or half-dried mucus. But the other cavity was in every dimension large, more especially in length; for it was produced to the whole extent of the left ventricle, lying upon its *external side, and full of blood,* such as I have already described in the porter (*n*); a small part of which blood had penetrated into that ventricle, and from thence into the third ventricle, two foramina having been made, reaching from that cavity through to the left ventricle, the one at the external side of this ventricle forwards, and the other backwards. The right ventricle, whose plexus choroides was somewhat pale, did not contain much water, and that was entirely free from blood. When I inverted the cerebrum, the trunk of that artery into which the vertebrals are conjoined, exhibited a small white elliptical spot; but, upon examination, I found it was not of that kind which is generally used to be the beginning of an ossification, as I had thought; but somewhat soft in the parietes of the artery itself, and rather in the interior coat; yet there was no prominence either internally or externally. Last of all, looking downward from above, I perceived the pituitary gland to be very low in the sella equina. And whatever I have here written, I demonstrated to many pupils who were present. *Morgagni, Letter* iii. § 6.

hemisphere, and within the proper substance of the brain, a cavity, partly filled with the remains of coagulated blood. The cavity in the right hemisphere was small. Morgagni seems to have fallen upon it by accident, in cutting irregularly into the substance, or (as the polite translator expresses it) " in cutting *here and there* into the substance of the brain ;" it was, in shape and size, such a cavity as might easily contain a very small oval prune, and was almost filled with a brown or half-dried mucus, the remains no doubt of coagulated blood: that of the left ventricle was long and large, occupying almost the whole of the hemisphere, ran along the whole length of the ventricle, and was full of blood. Nothing can be more interesting than the opposite characters of these two sacs; nothing can better demonstrate the consequence of successive impulses of blood: First came one slighter paroxysm followed by a slight extravasation, a limited cavity, the blood absorbed, in process of time, till a brownish mucus only remained, and the consequence was a slighter palsy of the opposite side; but a second paroxysm bursts (in the centre of the opposite hemisphere,) a larger artery, an apoplectic condition and a fatal palsy of the other side immediately ensues, and this cavity is found, upon dissection, to contain recent blood.

I cannot be too careful in establishing both the fact and the varieties of the fact; for we occasionally find within the brain of those who have been struck with apoplexy, cavities full of recent and coagulated blood; cavities half empty, but still occupied in part by the remains of coagulated and putrid blood; cavities from which such blood had been entirely absorbed, the cicatrix only and a small hollow remaining to denote the injury to the brain: and sometimes we find in one diseased brain all the essential marks of successive strokes of palsy, ending at last in apoplexy, and sudden death; of which perhaps the following narrative, in the words of Bonetus, will prove more interesting to you than any other I could have selected.

" A good woman, named Anna Oberhausen, wife of a carpenter of Geneva, of a full habit and fair complexion, of a sanguineo-phlegmatic temperament, nice and cleanly in her dress, aged 47 years, bore, at her first birth, three children, and had in all a family of nineteen; always her labours were severe, and her lochiae profuse; and, being but in straightened circumstances, her manners were frugal and careful. In the autumn of the year 1680, she suffered a severe paralytic stroke; she fell down speechless, and was paralysed in her left side. Instantly upon being called, I had her bled in the arm, and blistered in various parts, and by frictions, and whatever else might help to recal the spirits to the extreme parts, and by purges I tried to excite the splanchnic nerves: By these means this woman, whose voice

was gone, and whose whole side was palsied, recovered so far as to speak, though imperfectly, and walk, though with a feebleness of the affected leg and arm. Thus far had she recovered on the 7th day; and in a little while she was, by God's grace, entirely restored, saving only a manifest weakness in the palsied side. After this she bore a thriving child, nor could we perceive that any principal function had suffered, except that, though formerly notable and careful in family affairs, she was now idle, prodigal, unthrifty, began to drink, and was beaten for these faults by her husband, who proceeded from quarrelling to blows, and such blows as left marks, by no means equivocal, of his ill humour."

"From hence forward she suffered much from headaches; from vertigo like that of drunkenness, so that at times she almost fell down; she was in the habit of frequent bleeding to moderate these complaints: by putting a seton in the nape of the neck, I restored this woman to her family and to her household cares. She went of her own accord to the baths to dissipate the remains of her disorder, but returned nothing improved in health; from cherry brandy she could not refrain, and she snuffed inordinately under pretence of curing the disease."

"In the harvest of the year 1685, during the vintage, when all ranks, especially the vulgar, are apt to indulge, during the flow of her menses, which prevented the usual resource of bleeding, she was struck with a deep apoplexy and died suddenly. On the morning of her death she rose as usual and went to her daily labours; one of her neighbours reported that she had seen her carrying a must-vat on her head; that she had complained of unusual lassitude, had staggard in walking; and in short, had been shrewdly suspected of being tipsey. That she had, upon her return home, complained grievously of cold, and was going up stairs to bed, when she was struck with the palsy, fell down in the stairs with a total abolition of the animal functions, and her good neighbours, alarmed by the cries of her little children, ran to her assistance, found her lying in the stairs in an indecent shocking manner, lifted her and laid her in bed. I was called (says Bonetus) and delayed not a moment to come to her; I found her limbs trembling as if shivering from cold, her breathing loud and irregular; no hollowing nor pinching could awaken her to the slightest sign of life or sense, though by continual irritation I could excite an irregular kind of trembling in any member. The pulse quick at first became soon slow, then feeble and languid; the breathing became also slow and oppressed: upon pouring a little fluid into the throat, it flowed in part into the trachea, and twice or thrice excited a slight cough, and upon coughing she raised her head from the pillow, but presently dropped

down again. Strong scents and volatiles having failed, I kindled sulphur nd held it to her nostrils, but she was expiring, and even this excited no signs of life: hardly an hour had elapsed from the moment of the apoplectic stroke, to that in which her breathing ceased, though her pulse continued to beat; and her jugulars, as I have observed, in all those who are suffocated by the stagnation of blood in the lungs, were strangely agitated. But the pulse also gradually declined, became slower, weaker, stopped, ceased; and about ten in the morning she expired.

" At six in the evening the head was opened: upon dividing the scalp with a crucial incision, and tearing it from the scull, a serum flowed from the cellular substance, and a thin and watery blood from the vessels. Upon separating the cranium from the dura mater, innumerable guts of blood exuded, especially from the place where the falx adheres to the occipital ridge: Though over the right hemisphere the dura mater was cut with a knife, no serum nor blood exuded, nor was there a single drop of either extravasated betwixt the dura and pia mater. Now, for fear of interruption from the friends, I raised the brain from the scull by dividing the nerves and arteries, and carried it, surrounded by its pia mater, away, filling the scull cap with ashes to prevent the blood of the jugulars and sinuses regurgitating into the cranium and betraying the theft."

" Outwardly nothing seemed amiss in the brain; its surface was entire and sound, the sole peculiarity was a universal redness: In the veins leading towards the longitudinal sinus, I found air only, which I pushed along with my finger into the carotids: I injected wax of a brilliant green colour, which, without entering the cerebellum, pervaded all the arteries of the brain, and transuded through the wound of the dura mater. Seeking for the cause of the apoplexy, I cut downwards, with a slow and cautious hand, through the right hemisphere of the brain, till I reached the ventricle; and in the posterior part of this hemisphere behind the ventricle, I found a small oblong cavity, empty or nearly so, containing only a small quantity of stagnant humour: both this cavity and the surrounding medullary substance was of a brownish or yellowish colour, cut with difficulty, and seemed to have been long in this callous and hardened state. In the same hemisphere, and exactly at that point where the carotid branches cut into its various ramifications, I fell upon a similar cavity in which also a little of a serous exudation stagnated, and like the first it cut difficultly. Under the corpus striatum of the right side of the same hemisphere, I found a third cavity, resembling the two former, gaping at first, but its sides immediately collapsed, and adhered by a viscid mucus, but were easily separated again

so as to show the cavity, which, like the two former, was yellow and hard to cut. The right ventricle was full of a serous blood, part of which had overflowed into the left ventricle, having burst through a slit betwixt the Thalamus Nervi Optici and the Corpus Striatum; and in the center and substance of the Thalamus, the blood, bursting into the medullary substance, had formed there a large slit or cavity, which I found occupied with a coagulum of blood as large as a pigeon or hen's egg; and having washed the brain thoroughly, I found that the rent in its substance extended, ragged and irregular, quite to the root of the optic nerves. The right corpus striatum was neither so fresh nor firm as the left, but yellow flaccid, and as if wasted. The plexus choroides were sound, except that the right one was firmly glued to the first or uppermost of these cavities."

In this most interesting case, all the principles I have laid down are illustrated, and all the descriptions I have given are fulfilled. A constitution manifestly predisposed being assailed by irresistable impulses, successive effusions examplifying all the stages of extravasation and all the consequences; first, partially causing palsy, next, of great extent, and proving fatal. This Anna Oberhausen was of a full habit and fair complexion, and of a sanguineo-phlegmatic temperament, by which expressions, Bonetus means no doubt to describe a woman above the middle size, lusty, fair, and full of blood, arrived at her 47th year, a period of particular danger *. Recollect that each menstrual period is accompanied with a more vigorous action of all the system: that it is during the menstrual period, that hysterical or convulsive paroxysms recur; that tumors get an increase of size; and such period, and varices bleed afresh; that the cancerous breast is affected with particular pains and an increase of swelling; that ulcers are angry and inflamed; that periodical headaches or vertigo are aggravated; that the slightest accident of fever, cold, or alarm or fatigue brings disorder upon the system; that all the blood vessels are in so active a state, that often haemorrhages burst out from the nostrils, the stomach, or even the surface of the skin, and especially from ulcers and varices, so as to usurp the place of menstruation. The tendency of this function, superadded to the female system, plainly is to accumulate blood; and in consequence of menstruation, an indolent life, frequent child bearing, and profuse lochial discharges, obesity and an apoplectic habit are extremely frequent with women, especially at that period in which the menses are to cease. The irregularities of menstruation are thus the cause of hysterical disorders in youth, of head-

* "Inclinant utique in sanguineam apoplexiam, sanguineae feminae, desinente mensiam fluxu."—*Hoffman. Epicrasis, Case 2d.*

aches in the middle of life, of madness after child-bearing, and of apoplectic, vertiginous, and paralytic affections towards the wane of life; nor can we suppose a subject more exposed to those disorders than this Ann Oberhausen who, with a sanguine and plethoric habit, had born nineteen children in all, had always profuse lochial discharges, and had once born three at a birth *.

A poor and laborious woman of her low condition, must have been herself unconscious, and her friends inattentive to the preceding symptoms: when first struck, she fell down speechless and paralysed in one side: to this period, must we refer those three lesser cavities, or cavernulae as they are called, which were found in the substance of the brain. "Causam flacciditatis Corporis Striati prope spectare licuit: *Tres nempe cavernulae jam olim factae*, nunc quasi clausae et cicatricae obductae circumcirca corpus striatum apparuerunt." At this first impulse, the brain had surely suffered that kind of extravasation so frequent in other organs, so fatal in this; a general impulse of blood in its vessels, perhaps a suffusion of blood throughout its substance, but certainly direct extravasation in three distinct places, surrounding the Thalami Nervorum Opticorum and the Corpora Striata; in short, about the basis of the brain: In any less particular organ, or even in this, had such extravasation happened betwixt the scull and dura mater, the blood would have been partly absorbed, partly animalised, and the cellular substance thickened, the surfaces adhering again, and thus a temporary palsy would, as in cases of concussion or blows, have been followed by a complete recovery. But in the brain, though the blood was in part absorbed, the cavities could not be completely obliterated. The half empty sacs, the callous walls of the larger cavity, the brownish or yellow colour, the induration of the medullary substance of the brain, are the evidence of the original state of effusion, and prove to us another most important fact, that such trivial damage of the medullary substance is not absolutely and essentially felt throughout the system; that it is possible, where the effusions are limited, to suffer a complete palsy in the moment of effusion, while the impulse which causes, and the extravasation which completes, the paralytic state are both operating on

* "Instante nimirum menstruorum fluxu, tota massa sanguinea effervescente et agitata, postquam pridie plusculum sese invitaverat, venaesectionem quae saepe saepius opem tulerat, et forsan graviora mala averruncarat differre coactu fuit."—*Bonetus*, p. 143.

So that Bonetus found reason to ascribe even the immediate stroke partly to the present menstruation, partly to the neglect of an accustomed bleeding.

the brain, and yet to recover the use of the tongue, the arm, or the leg, along with a tolerable degree of health: but still we see, as in this case, marks denoting the injury in the brain, in loss of memory, and indifference to the affairs of life.

For five years this woman enjoyed a degree of health, but drinking, quarrelling, child-bearing, and the natural progress of the constitution towards decay, increased the predisposition: Headaches and vertigo, like the staggering drunkenness, mark this revolution in her health *: and in the heats of autumn, during the indulgences and labours of the vintage, in the moment of carrying a must-vat upon her head, she is seen staggering, is suspected of intoxication; is found lying in the stairs, in an indecent attitude; not in a state of apoplectic stupor and snoring, but cold, trembling, paralytic, with an intermitting pulse, and a slow respiration, and so she expires. In this last effusion the vessel which has given way is considerable; the blood bursts into the center or medullary substance of the brain, within the thalamus or medullary tubercle, which forms the chief part of the basis, and which gives origin to the optic nerve; the clot of blood extending to the root of the optic nerve, is as large as a pullet's egg, the extravasation proves inevitably and almost instantly fatal †. Less interesting cases I will not here detail but commit to the margin the notes of two cases,

* It is right to remind my reader of the nature of vertigo, which precedes or follows all severe affections of the head, and is the first proof of disordered circulation; nor can I represent this better than in the words of Van Swieten.

"A vertigo is almost the slightest of all disorders of the brain; and the greatest part, if not all disorders in the head begin with it; and in their cure, they generally leave a vertigo as the last symptom. In every vertigo there is generally an apparent rotation of the external objects near us, though they are actually at rest; and sometimes the things seem to be tumbling down from on high, or the reverse. When the disorder increases, objects begin to appear variously coloured, and soon after follows a vacillation or incipient inactivity of all the muscles: then the patient thus affected being afraid of tumbling, lays hold of any thing that offers, to support himself; but the body becomes in an instant so weak all over, that the patient falls down, and his sight wholly vanishes in the most obscure darkness: and this is the last symptom of which they are sensible; for, if the disorder continues, it terminates either in a deliquium, epilepsy, or apoplexy."——*Van Swieten, p.* 373.

† "Fortissimae denique et lethalis apoplexiae causas sequentes observavi. In ipsa substantia medullari, seu meditatio cruris dextri, amplum hiatum seu fissura, et in hac sanguinem concretum, ovi Columbini aut Galinacei magnitudine inveni; superius rimam egit erus medullare, per quam sanguinis concreti pars serosior, in omnes cerebri cavitates effusa, easdem opplevit, et oppilavit Alibi arteriolas aegritudine affectas conspicatus sum in ipsa medullari cerebri substantia quas sanguinem enmisse facile colligere licuit.—*Bonetus, p.* 143.

one by Morgagni, accompanied by a dissection, less accurrate or conclusive than this, and one transmitted to him by Rimini in the year 1721, by Jan. Plancus *,

* *A Venetian woman, aged fifty-five years, of a florid countenance, a large stature, and a full habit of body,* was subject to violent pains of the cholic. This woman, besides, had, ever since a certain time of her delivery in child-birth, (for she was the mother of many children) grown so prominent in her belly, that she was thereby prevented from going about most of her domestic offices, with promptness and expedition. On account of these complaints, *she said she could not bear to drink her wine diluted ; she therefore drank it in a pure state, and that not sparingly. She was now slothful, dull, and inclined to sleep ;* and for some days past, this symptom also had attacked her, either for that reason, or because her head was in pain, that she heard a very troublesome noise, of which she often complained. At length, about the third hour of the night, she said she was very ill ; and mentioned particularly a pain in her right temple and right eye ; and while she was sitting down on a chair, and asking for assistance, she was seized with an apoplexy, in consequence of which she fell on her left side ; but the motion of the right hand *was not lost till an hour afterwards.* At the same time, *she threw up from her stomach* the wine which she had drunk that day, though the quantity of it had not been greater than usual : but her exertions in vomiting were very weak and feeble. I don't find she had any more assistance than that of being put into bed, where she began to have a stertor ; and though she certainly lived till the sixth hour of the night, yet in the morning she was found dead and cold ; so that it was conjectured she died about the ninth hour. The weather was now extremely cold, for it was before the middle of February 1708.

I dissected the body, in conjunction with that excellent anatomist Jo. Dominico Santorini, other learned friends being present. The abdomen was turgid, and rather abounded in fat, as did the omentum also. Almost the whole colon was in a manner like that of a dog, &c.

Before we opened the head, we observed a large spot, of such a kind, about the mouth, that we doubted, whether it *was from the wine that had been brought up, or whether blood also had come with it. The mouth itself, which certainly had not been observed in the first hours of the apoplexy, was distorted to the right side ;* nor was it the effect of a convulsion ; for, besides that the limbs and neck were very flexible, I reduced the mouth to its proper place with my hand, the parts easily following without any force, and remaining where they were placed ; so that the paralysis of the face seemed also to have happened on the left side. Having cut through the cranium, which we thought was thicker than usual, we immediately saw blood to be extravasated beneath the dura mater, and to be shining through its substance. And that blood, as we perceived by dissecting farther, covered the whole right hemisphere of the brain ; for it even lay under the basis of the brain, and was formed into one continued lamina every where. This lamina being removed, not only the *sanguiferous vessels of the pia mater, both in the left and right hemisphere, were found to be more turgid than usual* here and there ; but we also perceived two or three foramina in that part which *covered the outer side of the right hemisphere, from which the blood, we have spoken of, issued out betwixt the two meninges.* For these foramina led into *a certain large and longitudinal cavity, formed in the medullary substance of the same hemisphere, between the external side and the lateral ventricle,* so as to be equal to two fingers breadth in width, and in length to six or more. This cavity was contained within unequal, *and almost eroded*

and hasten to conclude my remarks on the paralytic state of the brain, by a few observations on a subject in which, I am sensible, my narrow limits will not allow me to indulge, I mean those paralytic affections which seem local, without being truly so.

By Local Palsy, I mean not incapacities proceeding from pressure upon particular nerves, such as are often observed in surgical disorders; these I shall take occasion to describe in Cases and Observations which it is my intention to publish soon. I mean now to speak of Local Palsies which no pressure can account for, which must proceed either from a mere affection of the part, or from a disorder of the brain. Often we find the tongue paralysed, the cheek distorted, the side of the face benumbed, or the eye-lid affected, by the patient being exposed to a chilling north wind: We should hardly think of ascribing a palsy, so purely local, to any affection except of the part itself, but I am persuaded such affection of parts have a connection with the brain, from a phenomenon which I have very frequently had occasion to observe: a person often has irrecoverable palsy of one side of the face, from a cold, from a common cattarrh or rheum, and it happens thus: The patient, (generally advanced in years,) has got a rheum or common cold; the serous discharge from the nostrils, the gravid or loaded feeling of the head, the dullness or stupor are often accompanied with erysipelatous inflammation, and that again with a slight degree of delirium, especially during the night: after six or eight days of

parieties; it was full of a grumous blood, and had a communication with the right ventricle towards its posterior part: by means of which communication, a small quantity of blood had been poured into that ventricle, and a small portion had even passed over into the left, by breaking through the posterior part of the septum lucidum: but the blood had formed itself into a laminated concretion in each of the ventricles. It seemed, however, that some other vessel also must have been ruptured, since a lamina of blood was found below the transverse process of the dura mater, covering the whole cerebellum, though of a moderate thickness.——*Morgagni*, *Letter* iii. § 2.

"A few days ago we dissected the body of that man who consulted you last June, at Padua, upon a hemiplegia, which had rendered lame his left side, from a violent fit of palsy. Yet he did not complain of disorder, but from a dilatation of the heart and precordia, which you, from the remedies you so aptly prescribed, seem to have been sensible of at that time. But the right hemisphere of the brain, towards the temple, seemed to have been eroded with a kind of abscess; for there the substance of it was wanting to about four inches in breadth, and an inch and half in depth. And the Thalamus Nervi Optici, on that side, was less by two-thirds than the left: besides it was of a dun yellow, and appeared to have been closed by a cicatrix."

suffering, the fever subsides, the swelling gradually vanishes, but the tongue continues affected with a degree of palsy, the cheek too is benumbed, the eye-lid has fallen down, and the eye itself is oblique, is usually turned inwards, and the vision is lost. Such a disease I can have no doubt of referring to the brain itself; for though external inflammation might thus affect the cheek or tongue, swelling of these parts leaves behind it no degree of palsy; and such external affection could never reach the muscles of the eye, much less produce a palsy of the optic nerve: Yet one thing is I confess perplexing, that such local palsy happens always on the side affected, as if some thickening of the cellular substance or coats of the nerves injured the nerves betwixt the organ and the brain, unlike that palsy proceeding from injury of the substance of the brain, which affects always the opposite side.

Local injuries are sometimes so oddly mixed with palsy proceeding plainly from the brain, that were the physician not aware of such phenomena, he would naturally prescribe local remedies for a disorder of the foot, when his chief care should be to prevent accumulation of blood within the head.

"A gentleman whose case was communicated from the country, by his family surgeon, in a succinct and judicious narrative, was fairly advised to beware of his manner of living, to regulate his health according to the strictest rules, and to attend to the state of circulation within the head, though the original injury was in the Tarsus, and the pain, the trembling, the sense of confusion, which terminated at each paroxysm in the brain, seemed to begin in the foot, and could be traced along the leg. This gentleman was about the middle age, of low stature, full habit, and plethoric system, with a short neck, large head and shoulders, and plainly predisposed to palsy, yet enjoying perfect health. One summer's day in travelling in a post chaise, the horses in going up hill, either backed or otherwise endangered the overturning of the carriage, when he, with the improvidence so usual on such occasions, threw open the door, leaped from the carriage, and hurt his foot, by alighting with all the force of the leap upon a big round stone, which was received in the hollow of the Tarsus, and with such a shock that it was feared some of the bones were displaced. For three years from this unfortunate and very violent strain, he has always suffered more or less from the injury of the Tarsus, in which the pain and swelling were so great, that it was long believed, that, with a violent strain of the ligaments, some of the bones were actually fractured or displaced. During many months he was entirely confined; he was still longer lame

and disabled: Topical bleedings, sedative applications, and rest, brought at last the usual relief; though, lame, weak, and easily fatigued, he finds that the pain of the foot has much abated; the swelling is entirely gone.

"Within the last eight months, there has ensued a train of symptoms differing very widely from those of local disease: once a day, sometimes oftener, he is seized with a sort of paroxysm accompanied with sensations difficult to be described; the disorder is first felt in the foot, in a painful, tremulous, and benumbed sensation, which diffuses itself along the limb, affects the whole of that side of the body, and finally terminates in the head, accompanied with severe pain there, and a confusion of intellect, and a sense of feebleness, so great that he is glad to lay hold on any thing for support, but never falls, nor loses his senses, nor becomes epileptic: in a few minutes the sensation is gone. These paroxysms never afflict him while in bed; but are at times more frequent, independent of any sensible cause, and are invariably so when he is wearied and irritated: Since these paroxysms have begun, the leg, growing sensibly weaker, is now plainly paralytic, he makes a step with it more difficultly than formerly, he moves it by starts as if hinged with springs, and he carries it round in a semicircle at each step."

"No two complaints can be imagined more distinct, yet none are more in danger of being confounded than those with which this gentleman is afflicted; nothing could be more extravagant than to suppose them an affection seated in the tarsus; had (in the third year, and after a gradual progress of eight months,) extended at last to the head, and, through that, affected half of the body with palsy. No mistake can be more common, more unphilosophical, than to ascribe epilepsy to some local affection, which superficial reasoners imagine they trace from the affected part up to the brain, by the tremulous motion along the limb: yet with as much truth might it be affirmed, that epilepsy is usually caused by an affection of the eye, because, from the peculiar state of excitement in the brain, the patient has the strong sensation of seeing a fiery beam of light, or a sudden flash preceding each paroxysm, till he at last recognises this terrifying appearance as a sure sign of an approaching convulsion, and a signal to lay hold on something for support: with equal truth might it be affirmed, that the man who has had his limb amputated, is still possessed of a foot and toes, because he feels pain alternately in each toe, and can hardly be persuaded, even by feeling with his hand, that they are not still existing: such sensations are only in the brain; such nervous disorders as we have just described are also in the brain; a part wea-

kened by disease, and irritated by pain, is more easily affected, there the first tremulous motions are observed, in that extreme part does the convulsion apparently and indeed really begin, but its cause is not in the part. The ignorant are inclined to hope for a cure by caustics and issues applied there, and hold fast the part, or screw tourniquets about the limb to prevent the convulsion being propagated towards the head, but with such ill success, that by these unwise attempts to arrest the convulsion, while the whole body of the patient is stiffened, and he is staring with agony, the paroxysm is hastened to its acme: While the patient retains sense and consciousness, and long after he has lost the power of speach, and can only see and hear, while he is stiffened and staring in the increasing convulsion, but unable to express what he feels, his greatest wish is to have such cruel assistants refrain from screwing or pressing down the limb, which aggravates the torture. That in this gentleman the affection of the brain is more likely to reverberate upon the weakened limb, and be felt there in a painful trembling before it is recognized by pain and confusion of ideas, is much more likely than that any accident so common as a sprain, so long mending, and now so little painful, should affect, first all the body, (at least one side of the body,) and create daily paroxysms attended with confusion of intellect and darting pains in the head."

"The injury of the Tarsus had no farther share in this new disorder than by operating as a cause of confinement, as an occasion of ease and indulgence, as an interruption of the usual exercise, unaccompanied with any proportional abatement of the appetite or assimilating powers; it was from these consequences of confinement that this gentleman, of a habit conspicuously inclined to plethoric, is now peculiarly gross and full, with black strong hair, a glossy skin, a full round face, and prominent eye. By this sedentary life he has made much blood, and is in manifest danger of a compleat apoplectic stroke: his body is full, the affected leg emaciated, his arm not so useful, his face slightly distorted, his eyes languid and heavy, and his enunciation slow and difficult, as if his tongue was too bulky for his mouth. The body in all its motions inclines towards the sound side, the paralysed leg and arm being always advanced more forwards; he does not step with the leg direct and fair, as if it were fit to move itself or to support the body firmly, but carries it round in circles, and moves it with a start as if hinged and put in motion by springs: he inclines the body towards the other side, while he swings the palsied leg round, and puts it down with so little governance of the joints, that the shock agitates the body. Why, in short, should I describe what you all know, and I may express in one plain word, he is manifestly though slightly paralysed in all the

affected side, and I have, in consultation with Dr Monro, advised the strictest abstenance and care. First, we have expressed our decided opinion that the Tarsus is neither laxated nor fractured: Second, we have expressed our persuasion that the local injury has in no other shape contributed to this general disorder, to those frequent paroxysms, to this paralytic debility of all the left side of the body, than as an occasion of languor and inaction, and as a temptation to indulgence: Third, we have confidently ascribed his pain, vertigo, general debility, and paralytic lameness, to a still increasing fullness of blood which he must be careful to repress. Fourth, we direct his whole attention not to the weakened member, but to his general health, to the peculiar fullness of his habit, by abating which he may prevent the most distressing consequences. We have suggested to him upon the slightest increase of pain in the head, or vertigo, or sense of fullness, or more frequent paroxysms, to be bled or to apply leeches to the temples: to apply a blistering plaster over the pained part of the head: to put a seton in the nape of the neck, and to persevere in this severe but most necessary remedy: we have directed him to restrict himself in diet, which must be at once cool, sparing, and consisting chiefly of vegetables, of soups, bread, milk, whey, with a small bit of meat at dinner only: we have fordidden him to taste spirits, ales, or other fermented liquors, contenting himself with a glass of small-beer at dinner: we have advised him to avoid late hours, crowded rooms, public assemblies, violent exercise, altercations, or intense application of mind, whatever might agitate or hurry the circulation: we have directed him to sleep in a cool and airy room on a hair mattress, with the head bolstered high with pillows, and not to indulge in sleep: to pursue a regular course of exercise, walking, or driving in the gig: to avoid damp weather: to preserve the bowels always open with laxatives, and to take occasionally, upon feeling heavy or oppressed, a smart purge.

ILLUSTRATIONS OF THE LETHARGIC STATE OF THE BRAIN, OR SEROUS APOPLEXY.

While apoplexy is proved to be a sudden arterial impulse injecting the whole veinous as well as arterial system of the head with blood, and palsy a sudden yielding of vessels under that impulse, accompanied with effusion of blood upon the surface, or within the substance, or into the ventricles of the brain, Lethargy, Serous Apoplexy, is found to arise from serous effusion proceeding from slowly increasing congestion of blood and languid action of the veinous system of the brain.

It has ever been my wish, not only to instruct you in the knowledge of diseases, and to lay before you such plain unsophisticated reasonings as experience and reading suggest, but to bring you acquainted with the stile and manner of every conspicuous writer in our profession, to instruct you how to read his works, how to judge of his opinions, how even to receive his facts and narratives, for all are not equally to be confided in. This Somnus Praeternaturalis, this Sopor Insatiabilis, as it has been defined, has been a subject of deep and philosophical investigation with the celebrated Willis; and though nothing can be more obvious than that it depends simply on a serous effusion slowly increasing, and supporting a continued uniform pressure upon the brain, nothing can be more profound than Willis's definition of the cause. If this which I am now to recite, this insipid harangue about animal spirits and the corporeal soul, be pathology, (as Willis's book is entitled Pathologia Cerebri), no wonder pathology has gone into disuse. Willis also begins in the manner of Polonius, "To say what stupor is, we must first say what sleep and oblivion are, and of the first of those we have given already a full and clear account; for the essence of sleep consists in the corporeal soul abstracting itself for a while, and contracting its sphere of irradiation: First, it abandons the cortical cineritious or external substance of the brain; but in a little while the external senses also and the organs of motion feel themselves forsaken of the animal spirits: The corporeal soul thus retired into the interior of the brain, indulges itself in rest and quiet, while the pores on all the circumference of the brain, no longer traversed by the going to and fro of the spirits, and empty at the same time of nervous fluid, are open of course to the influx of whatever spirits may be anew secreted from the blood: Thus is it wisely ordered in the regular state of sleep, that at one and the same moment the spirits retire from the surface, and the nervous secretion enters into the pores; but in unnatural and disordered sleep, these relative motions are all disordered, now this way, now that, sometimes the outward, sometimes the inward motion taking place: sometimes the spirits, wearied and wasted, suddenly retire, and cause a reflux of the nervous liquor; or, the relaxed pores, inviting and attracting the nervous humor, its profusion repels and inundates the spirits. The many and various modifications, the particular ways and modes in which these things happen, we shall presently define; but in the meanwhile there can be little occasion to speak more of oblivion or loss of memory, since it is nothing more than insatiable sleep, viz. The expulsion or exclu-

sion of the animal spirits from the pores on the exterior of the brain being filled by some tremor *."

With such a piece of philosophy for the ground doctrine, all the reasoning on the diseases of the brain must have one uniform complexion; all its affections must be attributed to the imperfect concoction of the nervous fluids and animal spirits, to the inconstancy of their flux and reflux, to superfluous serum, or to corrupted serum driven outwards when it should stay within, or to various malignant and villanous humours mixed with and polluting the purer spirits. The cause of lethargy is plainly defined by Willis to arise from "Humours too abundant or incongruous, congregated within the pores of the cortical substance of the brain."

Let us take a humbler strain, and judge of the causes of lethargy, not from what may be passing in such invisible pores, but by what we plainly see in dissection. Willis would have acted more wisely both for the improvement of science, and for his own reputation, had he confined himself to the enunciation of great and leading facts in the plain unaffected language he has used in another passage: "I have often in dissection observed that lethargy proceeds from a serous humour surrounding the convolutions of the brain, and occupying its cortical pores; for in many of these dead of this disease, I have found not only the interstices full of a limpid serum, but its very substance softened by the moisture, the whole brain being not merely dropsical, but drowned in water.†

* Attamen de *priori* horum supra disserentes, ostendimus *somni essentiam* in eo consistere, quod *anima corporea* se paululum subducens, et irraditionis suae sphaeram contrahens, imprimis extimum cerebri ambitum, sive corticem ejus, et dein exteriora quaeque sensus et motus organa, spirituum emanatione destituat, et quasi fores occludat; proinde ut illi refectionis gratia intra revocati succumbant, et quieti indulgeant; interim *cerebri exterioris* pori, et meatis à spirituum excursibus immunes, et vacui, *liquori nerveo*, è sanguine pro novis spirituum copiis extillato aditum praebent. In *somno naturali* et assueto, binae hae concausae; tanquam ex naturae pacto quodam mutuo conspirant, et simul contingunt; scie. eodem tempore spiritus recedunt, et humor nerveus subintrat: in *somno* autem *nonnaturali*, sive extraordinario, causa interdum *haec* et quandoque *illa* prior est; nam vel spiritus defessi, aut avocati, se prius subtrahunt, et humori nerveo prae foribus aggesto introitum praebent, vel humor nerveus uberior loca ista adpellens, et quasi vi viam faciens, spiritus repellit eorumque meatus subiens, quasi inundat: utriusque horum varias occasiones, et fiendi modos particolatim assignavimus. De *oblivione*, sive *memoriae eclipsi*, vel defectu, non est ut multa *hic* dicamus, quoniam eadem omnino hujus, ac *somni immodici*, causa est, nempe *spirituum* animalium, ab exterioris cerebri meatibus, humore quodam plenis, *exclusio*, et commeatus pro tempore interdictus.

† Lethargum a serosa colluvie cerebri anfractus exteriores alluente, ejusque poros et meatus corticales subeunte, interdum oriri, OBSERVATIONE ANATOMICA SAEPIUS COMPROBATUM VIDI: In multis enim

Apoplexy and Palsy are the diseases of manhood, and are most frequent in the prime of life: Serous Apoplexy is the disease of old age: Apoplexy and palsy consist in sudden and impetuous actions of the arteries of the brain: Lethargy proceeds from a slowly increasing congestion in its veins, and consequent exudation upon all its surfaces: In apoplexy, the mind and senses, in palsy the body and voluntary motions, are suddenly affected; in lethargy, there is a milder affection of both, slowly increasing, in which there is debility but no direct palsy, torpor but no absolute stupor. Lethargy is distinguished from Hydrocephalus by absence of pain; from Typhomania by absence of delirium; from Apoplexy by the absence of stupor: It is a loss of memory, languor and indifference to all usual concerns and interests; a listlessness and torpor gradually increasing, till at last the patient slumbers perpetually, falls asleep in whatever posture you place him, at table, in company, in the midst of the most interesting business; forgets what he meant to say, and though excited again to speech, again forgets what he designed to say; he slumbers continually, is difficultly roused, and answers but with monosyllables, till gradually all the functions fail, and he becomes entirely insensible, vomits frequently, and dies slightly convulsed, or completely oppressed; yet it is an oppression unaccompanied, like that of apoplexy, with deep stertor: the pulse is throughout weak and languid, the face pale, and the body cold, the intestines torpid, and all the secretions (except that of a pale and insipid urine,) suppressed; when the patient dies, the dilatation of all the veinous system of the brain, and the universally increased exudation on all its surfaces, are so equally conspicuous that we hardly know which to suspect as the principal cause of death.

In investigating this state of the brain, we are not to look for any very direct and immediate cause, but are to consider those slow imperceptible changes, which advancing years, and indulgence in idle and luxurious habits produce, altering slowly the condition of the brain; it is the slow destruction which time alone, or, in other words, the gradual yielding of the vessels, under perpetual action, brings about, independent of the various imprudencies in our mode of life which forward the decline of nature: It is, I believe, a just and natural view of the subject, to say, that lethargy, or the

ab hoc morbo defunctis, plicarum cerebri interstitia, aqua limpida repleta, quin et extimam ejus substantiam, a nimio madore mollem et minus firmam: Insuper in nonnullis cavitates interiores lympha turgentes, et totius cerebri compagem, hydrope, seu potius diluvio inundatam reperi.—*Willis, page* 294.

apoplexy of old age, is the same dilatation and loss of action in the vessels of the brain, which gradually undermines the structure in other parts of the system, but no where with such important consequences: what leucophlegmatia and a varicose state is in the limbs, the serous apoplexy and veinous congestion is in the brain.

The whole fabric of the body consists in its blood vessels, its chief bulk in their fluid contents, its health and vigour in their sound and well proportioned action: In all parts of the body, the arterial actions are gradually prevailing over the resistance of the veins; and when, in the wane of life, the body begins to decline in strength and decay in substance, the change is every where denoted by the yielding and dilatation of the veins: this is at once the mark and the cause of the decline in the limbs. That those changes take place in the brain or other internal parts, we infer from symptoms, or discover after death: In a limb the dilatation of the veins is followed by an imperfect absorption, an infiltration of serum into the cellular substance, a thickening and swelling of the whole member, and ulceration at last: the patient drags on life, with such disorganization slowly increasing, in the limbs, in the spleen, the liver and other less important viscera: but in the brain, that dilatation of the veins which disorders its circulation, that imperfect absorption, which may be compared with the leucophlegmatic state of the limbs, does infinite harm; that disorder which thickens the cellular substance of a limb, because it can dilate, wastes and injures the substance of the brain, because the cavity in which it is placed is unyielding. With this slowly increasing compression, this new and unhealthy state of the brain, all its functions must fail; to slowly increasing compression, as in the slow growth of tumors, or in the hydrocephalus of young children, in which the brain is almost annihilated, we find it yields without the vital functions, or even the voluntary motions, being essentially injured; yet these are ultimately fatal: they are fatal as the serous state of the brain is, by producing torpor, paralytic debility, and slighter convulsion; and we have daily proofs that even the most gradual and slightest changes on the texture of the brain, have their effects on the memory, the judgment, and the general health. I know no disease in which the very peculiar symptoms, and very peculiar appearances on dissection, are so inseparably connected as in serous apoplexy: torpor, languor, loss of memory and intellect, occur in various affections of the brain, but never unaccompanied with delirium, with pain, with fever, or some other peculiar character of disease, except when it proceeds purely from the serous state. " A courtier of distinguish-

ed rank, (says Wepfer) and a prime minister, had for many years running ulcers, which had never been healed up, but were unadvisedly stopped in his old age: he was, at the age of sixty, afflicted with melancholy, on some occasion of favours and preferment ungraciously refused him; and in no long while, his domestics could perceive that his memory and judgment were both impaired: in the midst of a discourse, he stopped, forgetting what he had said, or what he designed to say; often he continued during three days in this condition, and then recovering his recollection, began where he had left off the preceding days, and finished, without stop or hesitation, the directions he had then begun to give. These interruptions of memory and reason were remarked from period to period, till in process of time his memory and reason were manifestly impaired; and at the end of half a year, he fell into a deep sleep, which lasted, without stertorous or noisy breathing, thirty hours; he died placidly."

"He never was heard to complain of headache, vertigo, or singing of the ears. The scull-cap being raised, a profusion of serum flowed out, insomuch that it might be moderately estimated at a fourth part of the whole contents of the cranium; vesicles were also observed in all parts of the surface of the brain, full of limpid serum *."

This I relate to you as a neat, and short epitome of this disease, which consists not in stupor, for the patient can be roused, but in mere somnolency, free from pain, delirium, fever, or any other symptom, unless it be sometimes, a slight vomiting from the affection of the brain, sometimes, a slight degree of paralytic trembling, or of actual palsy: the patient labouring under serous apoplexy is overcome with sleepiness, and incessant yawning, but, though he sleeps in all postures, and in the midst of the most interesting occupations, he can always be roused; though indifferent to his affairs and duties, his senses and faculties continue long unimpaired, and are exerted when roused; but the deep insensibility, which resembles that of apoplexy in all but the stertorous breathing and inflated visage, is only of a few days duration, and prognosticates death. Upon dissecting the brain its veins are found choaked with dark blood, and the ventricles and surfaces inundated with serum.

So little do we know of veinous absorption, or even of arterial exudation, that no prolixity of inquiry could carry us at all deeper into the philosophy of this disease. But its slow progress, and the causes which lead insensibly to this condition, are highly worthy of your attention. We are not, as in other affections of the brain, to look for any very immediate excitement, but to those habits of indulgence and idleness,

* Wepfer, Observatio 96. intitled "*Sopor funestus a colluvie serosa cerebri.*"

to those peculiarities of natural conformation, which predipose to this state; and it is a material point of my duty, to remind you how difficult it is to live in health, how much fortitude and self-denial is required to struggle against indulgences once become habitual, to live a hardy and active life, to maintain health and clearness of head, along with nimbleness and vigour of body.

The approach of old age is marked in all the visible parts of the body by dilatation of the veins, as in the lean hand and bald temples; its effects upon the internal viscera are known by languor of the circulation, and the imperfect performanee of the functions; but when to this natural decline are added luxury, indulgence, and a torpid and sedentary life, the veinous plethora advances rapidly, and diseases of the head are, next to swelling of the limbs, the most conspicuous effects of old age. Plethora, fullness, loaded with fat! forgetful, stupid, torpid, lethargic, are ideas and expressions so inseparably connected, that there cannot but be much truth in the observation on which those proverbial reproaches are founded: Look to the habit of a sailor, a soldier, or a slave; compare it with that of a citizen, a pampered man of wealth, or his cook or porter! in the one you see marks of irresistable predisposition to disease; in the other, alacrity, vigour, and health. In a whole fleet or army, where spare diet, and regular hours, and constant labour are exacted, there is not one man of that gross habit; not one fat, bloated, feeble, giddy, nervous; none apoplectic, except from intoxication, nor subject to those maladies of the nervous system, or distempers of the imagination, which we most dread: And since it is so, assuredly we have it in our power, by following a like regimen, to live in the enjoyment of health and intellect.

The most complete lethargy I ever witnessed short of death, and curable by medicine, was that of one born with an uncommonly vigorous constitution: this person had kept the books and accounts of a Company, and travelled about their concerns, which implies a life of the greatest activity, a sound head, and hardy body; and by living thus in perpetual activity of mind and body for a course of years, and advancing towards his 40th year, he had wrought his system up gradually to the highest state of health, was extremely bulky, with a full face, a florid colour, a prominent eye, and a gross and full state of body; but in his severe journies, performed chiefly on horseback, he had suffered a violent inflammation about the perinaeum; a complete fistula was formed; and being much neglected, extended so as to penetrate to the intestine, opening at the same time by many orifices in the perinaeum, affecting in short every thing but the urethra. After

a few journies, he could no longer mount his horse, nor get into a carriage, and became loathsome to himself; and an ill judged delicacy preventing him from disclosing his situation, he lived for a long time quite secluded, abandoned his usual active exertions abroad, found his memory fail, so that he could do nothing at home, sunk into slothful and solitary habits, eat, drank, and slumbered night and day, till his senses were entirely gone. He was completely lethargic: whatever he was forced by importunity to speak, in the way of answer, was so inconsistent and inarticulate, that his friends feared he had lost his judgment as well as memory, and that his situation was desperate. When I was called, I found him lying in a great chair, in a deep sleep, from which he was very difficultly roused: it was after many successive visits, that I was able to extort a few such answers as shewed me that there was something more to be inquired into than this stupor; and it was only by examining without his leave, indeed almost without his consciousness, and directed by more than one of my senses into the state of the parts. So deep was his lethargy, that for many days I was obliged to trust merely to the report of his servants and friends, who were astonished at his inexplicable situation, till they found that I did not regard it as desperate: In a few weeks, by frequent and drastic purges, and blisters over the whole head, he was cured of the lethargy, and restored to his senses, and the necessary operation performed; and having left him, with the Prince's injunction to his companion Hall, "Learn to live cleanly," he has recovered the natural vigour of mind and body, that though he could not, for many weeks, speak one intelligible or consistent word, regulates once more the concerns of a company.

It cannot have escaped your observation, that at a certain period of life the human constitution undergoes a change, the full import of which you may not perhaps conceive, but which is at once accelerated by idle and luxurious habits, and rendered more critical in its consequences. You observe a man having a constitution capable of the most vigorous health, urged on by over-feeding and a luxurious and indolent life, into obesity and premature plethora and veinous dilatation: the cellular substance continues distending, the veinous system dilating, and he arrives at the age of 45, in uninterrupted and increasing health: But the arterial actions once repressed by veinous plethora, the body comes to be less perfectly nourished, the head to be loaded with blood, vertiginous complaints begin to be sensibly perceived, the stomach begins to be affected, and the spirits to fail; and to the affection of the stomach, is attributed the decrease of appetite, the consequent defect of nourishment, and the concomitant wasting of the body. Is it then to an affection of the

stomach, to idiopathic dyspepsia, to a mere defect of nourishment, that we are to ascribe this utter ruin of the system, this universal affection of all its functions? By no means; question your patient, and you will find, by all his lesser complaints and feelings, that an increasing congestion in the veinous system of the head has, by injuring the function of the brain, affected at once the appetite, the strength, the spirits, and the whole health; you will find that headaches, vertigo, languors, and dejection of spirits, hypochondriacal affections, incapacity for business, a necessity for air, exercise, and company, precede this wasting and emaciation of the system, a state of the system requiring in my opinion prescriptions very different from chamomile emetics, and doses of bark and port-wine. At the period of this revolution in the health, the vertigo, headaches, dyspepsia, and emaciation, keep an equal pace; no sooner is the health and fullness of the system wound up to this extreme point, no sooner does a man, inordinately lusty, fall off in flesh, than the utter ruin of his health and spirits ensues. This revolution must be ascribed to the gradual decline of some organ; and I leave you to judge to which cause you are to impute such changes, whether to the stomach, or to the brain? In the brain, as in the limbs, veinous dilatation is the invariable precursor of serous exudation, and veinous congestion and serous exudation are the causes of these phenomena.

I am persuaded that the numbers who die, having but a little passed the middle stage of life, of no formed complaint, but of gradually declining health, of debility, hypochondriacism, indigestion, languor, and wasting of the flesh, die from this indisposition of the brain; and that the lethargy, or apoplexy of old age, is the ultimate stage of this disease; and I think I can observe, that the predisposition which in men arise from an indolent luxurious life, arises in women from the peculiarities of their circulating system, from menstruation being necessarily connected with the general circulation, and the necessity of this habitual discharge: Menstruation gives the female system a natural tendency to plethora: early menstruation and frequent child-bearing, of women in warm climates, makes them early old; early marriages and frequent child-bearing, in women of our colder climate, disposes them to obesity; none are so loaded with fat, as those who have borne many children, for pregnancy and suckling are attended with such peculiar actions and such general excitement of the whole habit, as to produce a secretion of fat, and a veinous plethora. The menstrual flux, so essential to the fecundity of the uterine system, is a dangerous complication of the general circulation, and its tenden-

cy to produce disease cannot be understood without remarking its reaction upon the brain : even the occasional fullness which precedes menstruation, and the occasional highly irritable state of the system which attends it, influences the whole body. But the necessity of providing for so great an extension of substance as the womb suffers, in pregnancy, and for the nourishment and growth of the embryo, is a cause of great irregularities of circulation, and of oppressive accumulations of blood : hence the chief disorders of women, who are subject to headaches in youth, to stomach complaints, and ill health, while menstruation is yet irregular and not established, to hysterical and other fits, during the prime of life ; to obesity, women are most peculiarly predisposed, in the decline of life, and to lethargic stupor, and the slighter degrees of palsy, in old age. Often I have seen irregular menstruation produce habitual and dreadful headaches, those headaches attended at times with symptoms of temporary or slighter effusions of serum, and those effusions at last irremediable by any natural powers of the constitution, and fatal, causing, in the first instance, symptoms of insanity, and in the second symptoms of apoplectic torpor.

Nor should you wonder at finding me ascribing this lethargic or serous state of the brain, to various and apparently incongruous causes, to severe and protracted studies, to an intemperate as well as to an indolent life : I follow experience only, and state facts, such as it would be my duty to state, though I could in no degree explain them : Yet, if you reflect on the first change of structure, viz. veinous congestion gradually increasing, gradually oppressing the brain, and slowly lessening the absorption, you will not be at all surprised to find such a state as effectually produced by study, i. e. by continued intense excitement of the function of the brain, as by intemperance.

No abstract description of this disease can be so impressive as a case, or can so happily represent to your imagination, the slow progressive effects of physical disorder of the brain, in destroying the physical properties of the body, and along with these the faculties of the mind. The gentleman, whose case I am now to deliver to you, fell down stairs, and his immediate death was occasioned by an extravasation of blood, either consequent to the fall, or produced by the sudden bursting of some blood vessel : But his disease was the serous or lethargic state of the brain : the period of it was long, its process gradual : not a symptom, or no material one, is wanting in the following narrative of his case. He was afflicted with a slow train of paralytic and nervous affections : and was conscious, during many months, of the slow decline of his appetite and health, of his vigour of intellect and strength of body, of his vision, his powers of mastication, and of deglutition : he slumbered in his chair,

in his chariot, at table; in all occupations and postures, and finally, his fall was occasioned by this stupor and paralytic weakness, hardly any function which the brain regulates remaining entire.

"This gentleman, a man of distinguished rank, was seized in spring with cramps, first in the calves of his legs, then in his thighs, and lastly in his hands and fingers. Towards midsummer his neck became painful, and his head was drawn to one side; he caught a cold by drinking lemonade when over-heated, and, by a day of violent exercise, he greatly increased the catarrh. Various plasters and ointments were applied to the pained and rigid part of the neck; but, while this was adoing, he began to observe a dimness of sight, with an appearance as of clouds floating before his eyes, and his palate became insensible, whatever he ate seeming tasteless: he used warm baths for several weeks, but without effect: he was then seized with a puking, which an emetic seemed to relieve, but in a few days the sickness returned, and what he vomited was sometimes frothy, sometimes bilious, often he simply vomited the meal he had taken.

"His appetite was now entirely gone; his food seemed quite insipid; and he felt as if, instead of a savoury morsel, he was chewing a bit of stick: the vomiting increased; the obscurity of vision was deeper; he often saw double; often for days he could not write a letter; in speaking, he was sensible at times of a degree of hesitation, and was conscious of particular difficulty in pronouncing the letter R; thus slowly and gradually did these paralytic symptoms increase. He was now so very drowsy that he dropt asleep at table, and his sleep was heavy, oppressed, and snoring: he felt great lassitude and languor, walked very feebly, yawned long and wide, and when the fits of yawning came upon him, his speech was more interrupted, and he uttered the few words he was forced to speak with the greatest difficulty. This vomiting was often preceded by eructations; the saliva flowed from his mouth; the torpor and confusion of vision was particularly distressing, and for many months he continued to pass great quantities of pale urine. His pulse was throughout weak and frequent; want of appetite, and continual sickness, brought on great emaciation, he was pale and weakly, suffered much from anxiety of mind, and yet was able to undertake great journies.

"About a month after he had begun to use the warm baths, Wepfer was called to him, and found him in the evening speaking with difficulty, as if his nostrils were plugged; he complained of obscurity of vision, he saw double, and before supper he puked; he ate little, slept most profoundly during the whole night, which was

that of the 11th of October 1681; and on the 12th, in spite of the earnest intreaties of Wepfer, he would set forth upon a day's journey, which he did accomplish before the evening, but arrived languid, fatigued, and fasting: four times during the forenoon of this day, and while upon his journey, he vomited, and had not advanced two miles when he began to slumber: he made his dinner of eggs, and a boiled quince, for he abhorred animal food, and all the afternoon he slept profoundly in the carriage; arriving late and wearied at his journey's end, he ate little, and slept profoundly the whole night long: In the morning he vomited much, and there seemed, before each fit of puking, to be strong heavings in the diaphragm, so that his face was inflated, and the tears ran over his cheeks, and after the stomach was emptied, he continued puking and reaching; yet he went abroad in his chariot, dined lightly on eggs and a boiled quince, and went after dinner to see the king pass in triumph.

"About four o'clock in the afternoon he fell down stairs, and was raised from the ground in a state of deadly stupor, his jaws alone clenched firmly, his limbs powerless and relaxed: Being laid in bed, a cordial was poured into his mouth, and he streight way became warm, complaining when he was revived of excessive heat. We believed (says Wepfer) his fall to have been the consequence of his confusion of head and weakness of limbs."

"I found (says Wepfer) his pulse quick and respiration regular; he complained, when raised up, of violent pain, nor could he suffer his back to be touched, the lap of his ear was torn in the fall by his ear-ring. Wepfer, now deliberating what to do, ordered only a sharp glyster, but refrained from bleeding, apprehending that there was actually a serous effusion within the head, the signs of which were torpor and somnolency, vertigo, and staggering, cloudy vision, and an impediment of speech, such as could not be attributed to the slight ulceration which was observed on the tongue, nor to a slight swelling of the tonsils which had now disappeared. The glyster was not returned for two hours; he began to move his head about; then sat up of his own accord, without help, and puked several times, but without vomiting: he had next several very fetid stools; and was plainly conscious of his filthy condition, which he expressed by uneasy and restless motions; but could not speak, although immediately before those loose stools, he had spoken a few words to Wepfer, expressive of uneasiness. All night he lay as usual, snoring in a profound sleep, extended like a log, without apparent feeling or sense: Wepfer ordered blisters to be applied to both legs and arms, and prescribed a cephalic water, but

nothing lightened the stupor; he never stirred a limb; he sometimes swallowed a little, but his jaws presently clenched again.

"In this condition he lay seven or eight days, when Wepfer, by the advice of Hamerer, ordered his shoulders to be scarified, and cupped with large cupping glasses: neither frictions, pinching, nor any other kind of excitement caused the slightest appearance of sensibility: He now lay in the deepest apoplexy: cephalic herbs steeped in wine were applied over his head, and live pidgeons cut in halves: Petit was now called, to whom they related all the circumstances of the case, who, notwithstanding the little remaining strength of the patient, ordered bleedings, vomits, and purges, to remove, if possible, the apoplexy, which he regarded as the chief cause, believing that the vital powers were only oppressed, not destroyed. He was bled till the pulse in the other arm began to fail. Of the purging potion he could take but a few spoonfuls, so slowly and imperfectly did he swallow. Next morning, before day, he was seized with a horrible epilepsy of the right side, while the left lay paralytic: long after each epileptic paroxysm, no pulse could be felt, and when it did return, the stertorous breathing began again. He was made to swallow a few spoonfuls of the cephalic water; and continued to have loose and fetid stools: the pulse and breathing varied: towards five in the morning, the pulse sunk, and death seemed to be approaching: his eyes, to the very moment of his death, were distorted and agitated by a perpetual convulsive motion. From five till nine he was tortured with pain, and with horrible paroxysms of epilepsy: the upper parts of his body were bedewed with sweat, his lower extremities were cold, his eye became flaccid as if a part of the aqueous humor had been discharged. The head was again drawn convulsively to one side: he now and then raised his arms: he died before twelve o'clock, the twentieth day from that of the fall."

DISSECTION.

"In the abdomen and thorax there was, as far as I could perceive, (says Wepfer) nothing remarkable. The fall had assuredly hurt only the thorax, for one rib was broken and projected inwards through the pleura, which was greatly inflamed; but on the head, though the ear-ring was ruffled by the fall, the scalp even was not bruised; there was certainly no mark of ecchymosis: the most prominent parts of the frontal and occipital bones were bumpy and almost gummatose; they were invested with pericranium of a natural colour, though rather inclined to whiteness: it

was difficult to raise the cranium from the dura mater, so firmly did it adhere; while the cranium itself, unusually brittle, crashed and crumbled with the slightest force, and the frontal sinuses were large and quite empty. On the left side, a foul serum issued from the low parts of the dura mater; it resembled the washings of flesh, and in part coagulated; and on laying open the dura mater, much grumous blood was found betwixt the meninges, among the convolutions of the brain, on the corpus callosum in the left ventricle, and in the third and fourth ventricles, and under the basis of the brain, and the left hemisphere appeared softer and more pulpy than the right, while the internal surface of the ventricle seemed rough, fleecy, and coated with a sort of mucus. Upon cutting out the brain, much yellow serum flowed from the canal of the spinal marrow; and in the cranium, in its basis, near the os petrosum, was something like a capillary fissure; the scull, from its dryness and brittleness, sounded like a broken jug, but there was no fracture, for a similar rent was seen on the other side *."

There must ever be something mysterious in cases of this nature: nothing can be more difficult than to decide whether, in the present instance, the extravasation happened in the moment of the fall, or whether it happened from the sudden giving way of some artery in the basis of the brain, betwixt the 8th and 9th day after the fall. If it happened in the moment of the fall, it cannot but seem wonderful, that a man whose brain was oppressed with so extensive an extravasation, should speak, complain, feel his pain when the injured part was touched, and even raised himself without help in bed; (yet that is in perfect consistency with various cases I have related:) If it happened on the night betwixt the eighth and ninth day from the fall, we cannot but wonder at extravasation taking place immediately after bleeding, a measure which, though quite from the purpose in a case of serous apoplexy, should have prevented any haemorrhagic effusion. I am, at any rate, contented to have thus curiously described to you the state of the whole system while the brain is drowned in this serous effusion, and the slow successive steps by which the functions are dissolved, death approaching. For this complaint, you will have remarked, began with the slightest nervous tremors, with cramps of the legs and thighs, a slight distortion of the neck, then dimness of sight, an appearance as if clouds were floating before the eyes;

* This seems to have been the Additumentum Suturae Lambdoida, in which they were in danger of marking down as a fracture, for the concluding words of his narrative are, "Aune forte sutura hiantior?"

double vision; loss of taste; loss of appetite, sickness; bilious vomiting; hesitation in speech; the words hardly audible, and uttered with difficulty; and there was added to the other phenomena, that decided sign of palsy and debility, the saliva dropping from his lips. These were all accompanied with such stupor, that he fell often down flat upon the table in deep oppression; there was continued lassitude, languor, feebleness of gait, perpetual drowsiness, snoring and long continued slumbers; at last, from increasing feebleness and stupor, his limbs tottered under him; he fell at last down stairs, and after lying insensible for ten days, he expired. All this is well depicted in the narrative, and with this vivid impression of the condition of one verging towards death, oppressed with the serous apoplexy, I take my leave of this subject proceeding next to describe the various consequences of the inflamed state of the brain.

SKETCH AND ILLUSTRATIONS OF THE INFLAMED STATE OF THE BRAIN.

It will, I am conscious, require thought and meditation to recollect or describe the many forms of inflammation of the brain. The inflammation of an organ of such wide influence in the system, and so essential to life, must be attended with various and terrible symptoms. The issue or termination, as it is called, of inflammation in any given organ, (viz. by resolution, suppuration, or gangrene), must depend on the peculiarities of its structure, and on the laws of vascular action, but this however relates merely to changes of structure, suspected before, and visible only after death: but the symptoms of inflammation, the phaenomena produced in the general body, must depend upon the peculiar office of the affected organ, on its importance to life, on its influence over the whole system. In an organ, important and extensive in its influence as the brain is, the symptoms must be both violent and very anomalous: Pain, sickness, and constipation are the symptoms of inflamed abdomen; pain, cough, difficult breathing, bloody or viscid expectoration of the inflammation of the lungs; delirium, fever, sensibility to light and noise, and in the end, blindness, double vision, convulsions, howling, and the most unnatural and horrid screams, are the ordinary and inseparable symptoms of inflamed brain; but the various terminations in serous exudation, suppuration or gangrene, ulceration on the surface, or abscess within the substance of the brain, give a horrible variety to the symptoms.

Every step in physical knowledge facilitates every succeeding one: acquainted as you are with the general structure of the brain, and with many of its fatal affections,

you will readily conceive that there are many peculiarities in the structure of the brain, to give a singular and atrocious form to its very slightest diseases. First, the proportion of arteries and veins in the substance of the brain, of the action of the one, and of the resistance of the other, is so curiously adjusted, that the slightest loss of balance affects the function. The veins being dilated in the progress of life, and loaded with blood by some sudden impulse, all the effects of compressed brain instantly ensue: thus it is in the apoplectic stroke, when a sudden impulse from the arteries surcharges the veins, obscures the senses, checks the violence of the circulation, and makes the pulse and breathing slow, while the body is paralysed. But inflammation, whether extending over the surfaces or concentrated in the substance of the brain, is a high arterial action uncontrolled and unopposed by any accumulation in the veins, which takes its complexion from the degree and manner in which the brain is affected. Inflammation is the disease peculiar to child-hood or youth, to that stage of life in which a free and rapid transmission of the blood through the veins seconds the high action of the arteries; the senses, in place of being obscured by inflammation of the brain, become at first more acute, the eye more sensible to light, the ear to noise, and the whole frame to heat or any other exciting cause. The pulse is quick and fretful; the pain of the head intense and keen; and this dreadful headache tortures the patient till drowsiness, stupor, convulsions, double vision, blindness, and, at the last, total insensibility and death ensue, in consequence of serous exudation oppressing the brain.

But inflammation takes various forms as it affects the membranes, the surfaces, or the medullary substance of the brain, a part or the whole of it. You recollect the extent of surfaces of the brain, and the exquisite vascularity of the membrances, by which those surfaces are lined or involved! You are surely aware of the consequences: you surely have foreseen that this more than any other peculiarity must give the character to inflammation of the brain. Under high action of the arteries, exudation or serous effusion is inevitable; such effusion must happen; in any part in the brain it is fatal. A school-boy heated by running at a play, fighting and quarrelling, sweating first, and then exposed to cold, and sometimes lying basking in the sun, sometimes running hard, suffering also occasionally from falls and blows, has his brain inflamed as suddenly as the glottis and trachea are in Croup. He returns home after a day of violent exercise, feverish and languid; his pulse is quick and fretful, his cheek flushed, he complains of his temples, and hangs his head, throws himself across the bed, and presses his forehead or temples with his hands; then he cries and shrieks with the acute pain; he cannot endure the light,

nor the tread of a foot in his chamber, till in a few days the watery effusion going on from the first, shows its effects in the end; he begins to slumber, a sort of stupor, interrupted by dismal and piercing cries, follows the acute pains of the first day, the eye at first unable to endure the light is now insensible, the child squints, sees double, vomits, becomes entirely blind, and convulsive and automaton like motions ensue, consisting sometimes in a rotatory motion of the head, sometimes in a circumgiration of the hand; he gradually sinks into a deep stupor, and dies on the fourteenth or twentieth day with inflamed membranes, and a serous effusion into all the cavities, and over all the surfaces of the brain.

The import of these signs cannot be mistaken. But if such phenomena truly arise from the high vascular action extending over so great a surface, must they not be inseparable from every form of inflammation, almost from every form of disease in the brain? And they are inseparable! I never dissected a tumor, nor an abscess of the brain, from disease, or from external injury, where there was not serous effusion; never saw a boy die from fungous protrusion of the brain, in consequence of fracture of the scull, or rather of the injudicious use of the trepan, in whom I could not distinguish the signs of such effusion; the boy, expiring under fungus of the brain, shrieks during the inflamed stage, and is insensible or convulsed during the latter stage of serous effusion, and dies of water in the head. I cannot refrain from transcribing from my case book the abrupt notes of one dissection as an epitome of all the dissections of this kind I have there recorded.

The death of this boy, (who had been imprudently trepaned, a large portion of the cranium being ignorantly and wantonly removed, and the brain exposed unsupported except by the delicate dura mater,) was owing to a universal inflammation, and a partial protrusion of the brain. "When his parents first came to visit him in the hospital, he was sitting up in bed while his head was shaved; he held his pocket handkerchief in his hand, and wiped away carefully and nicely the blood that ran down his temples; he had never been discouraged, till upon seeing his mother, he laid down his head in her bosom and fell a crying and complaining of his head: thus entire were his senses and his faculties before the operation, which was immediately and most imprudently performed. He cried all the night succeeding the operation with pain in his head, but at eight in the morning of the second day I found him perfectly collected, nor was there the slightest degree of coma nor slowness, heaviness, nor interruption of the pulse: for five nights he was slightly feverish, restless, tossing, crying out with pain in his head; he was able to turn in bed, and to choose his side for lying upon,

never vomited, but had a total loathing of food and great thirst, drinking toast and water incessantly."

" On the fourth day, the first dressing was raised, when the taking off the salutary and necessary pressure on the brain made a sudden and terrible change; from the moment of raising this first dressing, he never held up his head, nor turned himself in bed, nor called for drink: his cries were now converted into shrieks: he had no convulsion, except a singular tremulous motion of the lip, which for one or two days returned frequently, and continued for ten minutes at each return: his eyes were usually but half closed, and turned up, or staring open: his cries made the wards and stair-cases ring, and returned every ten minutes, rising gradually from a complaining to the most piercing outcry, as if he had been surrounded by flames which first approached, and then scorched him. He without opening his eyes gropped forwards as if expecting to catch something with his hands; this was a frequent motion with him, accompanied usually with dismal howling: he was continually working with his right hand and leg, (the side on which the head was injured) as if with design of drawing up the bed cloaths, while the limbs on the opposite side lay still and motionless. The pulse was throughout quick, weak, and thready; the hands and feet were cold; the face deadly, pale, and only a little flushed on the centre of the cheek, while he was screaming with the agony. He died on the eleventh day. The last day his shrieks subsided into stifled groans and sighing, he grew all that day gradually weaker, and expired without a struggle."

" The state of the brain in this boy exactly resembled that of ————. The ventricles were full of serum, and very greatly enlarged. Wherever there is much arterial action, there must be much veinous congestion; and I found, accordingly, upon all the outer surface of the brain, and over all its convolutions, the visible arteries and veins extremely numerous, as if delicately painted or minutely injected. Upon cutting into the substance of the brain, there appeared innumerable points of a deep leaky colour, spewing out black blood, manifestly the sections of much dilated veinous branches The veins on the inner surfaces of the ventricles appeared very big and straight, not tortuous as on the other surfaces, but running, (though dilated,) in straight lines: the ventricles greatly distended were full of a serous effusion tinged with yellow, like the serum of a blister, and their surfaces were in some places rough and spotted with a coagulable lymph. Beneath the fracture, in the substance of the right hemisphere of the brain, was a great abscess from which that matter was discharged which poured through the opening while the boy lived, and

all the surface of the brain was suppurating, and coated with a cream-coloured pus, such as membranes always secrete, such, for example, as you scrape from the surface of any strong fascia while in a state of ulceration: the inflammation which had reddened all the surface of the brain, and coated it with pus, had also caused an effusion of water every where, very yellow, like the thickest serum of a blister; much of this was found in the occipital hole, and down in the sheath of the spinal marrow. While the surfaces and particular parts were thus suppurated, the general substance of the brain was greatly hardened; it was so particularly firm, that when cut away, slice by slice, down to the basis, so as to leave but a thin plate of it, that plate flapped backwards and forwards with all the firmness of a muscle, in place of dissolving under the touch: Upon seeing such a condition of the brain, such dilatation both of the cavities and blood vessels, and such universal disorder, you form a lively conception of the confusion of intellect, the torturing and fiend-like state in which the creature must pass the days and nights which immediately precede dissolution."

By delivering the notes of this dissection, without altering the slightest word, I impress you, I doubt not, with the conviction which I have always felt, that not only is Hydrocephalus the most frequent disease, but such serous exudation the inseparable attendant of every inflammation of the brain: all those boys who are, either from fracture or accidental causes, afflicted with inflammation of the brain, after shrieking thus, die comatose, from dropsy of its cavities; nay, I am persuaded, that every slighter headache is an inflammation of the brain, as much as febrile diarrhoea is inflammation of the abdomen, or rheumatism inflammation of a joint. I am persuaded that I have often, in practice, seen headaches which could not be but attended with slighter degrees of effusion, but such as were absorbed again; and I shall prove to your conviction, unequivocally, that periodical and violent headaches are sometimes followed by the most extensive congestions of serum, and in short with fatal Hydrocephalus, in the adult as in the child.

There are certain peculiarities in the structure of the brain which establish this as the natural course and termination of inflammation: First, the surfaces are of great extent, and the membranes very highly vascular, hence the high action of the vessels is most naturally relieved by serous exudation: There is not in the brain that loose cellular substance which surrounds the muscular parts, and forms so great a proportion of other viscera: there is no space for those occasional serous and blood effusions in the interstices of its proper substance, which causes large and yet harmless suppuration of less important organs; whatever effusion does take place in the brain, injures its very

substance, and affects its offices, stops the course of the excited arterial action, and produces palsy: suppuration of the brain is thence comparatively rare.

Secondly, In the adult, with a fuller circulation, a ripened intellect, and the brain perfect in all its functions, inflammation affects more conspicuously the faculties of the mind, and hurries precipitately on to its terrible and fatal conclusion, and is fatal in a few days, before exudation can take place: First the pulse rises; the eyes are red, moist, and watery; the senses are in confusion; the skin is parched and hard; the headache intense and agonising; a furious and frantic delirium ensues; and, after two days of struggling and striking sometimes with maniacal strength and fury, the patient falls into a state of torpor; the eye deadens, the extremities become cold, the face haggard and wild, the features shrunk; the patient stares without seeing; picks the bed-clothes, and makes the motions of gathering motes in the air; passes his urine and faeces involuntarily; and, after a few hours of muttering delirium, expires. This is the Phrenitis of modern writers, the Sideratio of the ancients, the Sun-stroke or Coup de Soleil of warmer countries; this disease, more frequent on the continent, especially in Germany, Bavaria, in Italy, and the south of France, is known in this country, especially among the vulgar, by the name of Brain-fever; is often produced by long summers walks, hard riding, long exposure to the sun's rays, and especially it is caused among workmen and labourers by sleeping at mid-day in the sun: the brain, as I shall prove, though sometimes merely inflamed or slightly suppurated, is very often in such cases blackened and gangrenous.

Thirdly, The circulation within the brain is too impetuous to allow of slow and gradual suppuration, and that loose cellular substance is wanting, which allows of serous or mixed exudations leading to suppuration in parts otherwise constituted. General inflammation of the brain invariably terminates in serous exudation, in delirium, oppression, and stupor, or in actual gangrene: suppuration is rare, and when it occurs, it is usually a local disease; its progress also is slow, for the sensibility of the brain, like that of a bone or other seemingly insensible part, is very slowly roused. We have indeed every reason to conclude, that suppuration of the brain is owing to some local injury: often from a sudden slipping of the foot, a fall, a shock, a slight blow, an exertion in raising a heavy weight, some smaller vessels within the substance of the brain give way: sometimes the feeling is so distinct, that the patient is conscious of something having yielded within the head. I shall presently prove, by fact and demonstration, that local suppuration of the brain does ensue after such sensible yielding of some part within the brain, accompanied with the distinguishing mark of slight

palsy. Suppuration of the brain also arises from caries, from a slow scrophulous disease, especially from an affection of that part of the temporal bone in which the ear is formed. The ancients universally ascribed suppuration to corrupted blood, and of course attributed such suppurations not untruly to rupture of lesser arteries or veins, and all suppurations betwixt the scull and dura mater they ascribed to extravasation: They went farther, and supposed, that even while yet contained within the sinuses, where the circulation is slow and languid, blood might so stagnate and corrupt, as to cause abscess. Vomica Hypocrania, or abscess under the cranium, was the term by which they distinguished this suppuration; and their theory of that particular suppuration which is so frequent under the temporal bone, near the angle of the Lateral Sinus, was this, that it arose from the blood stagnating in that corner, where its motion was imagined to be slow, and its temperament apt to be corrupted.

Suppuration of the brain is always local; it begins in one point, ripens so slowly as to form for itself a firm and often a thick sac; the abscess is fairly circumscribed; constant pain marks the fixed seat of the disease, and occasional headaches, sometimes dreadful, and accompanied by a temporary delirium, mark the paroxysms of general inflammation: But though the destruction of the proper substance of the brain is gradually extending, according to the growth of the abscess, the faculties are nothing impaired, even while the pain rages: it is only when the inflammation extends to all the brain, when the exudation becomes general, when the ventricles are dilated, and the surfaces inundated with serum, that squinting, double vision, stupor, palsy, or convulsion appear: these are the forerunners of death; and the patient dies, not of the local abscess, but of the general disorder in the brain. A patient, whose proper disease is an abscess within the substance of the brain, dies (like the boy whose case I have just narrated) of hydrocephalus, distinguished by all its pathognomic signs.

You are thus prepared to meet, in every narrative of such diseases, with repeated proofs of one great pathological fact, viz. That those slighter effusions of blood or of serum, which in the less noble parts cause only an outward swelling, repress the high arterial action, and lead to resolution or suppuration, are, when they take place within the cavities, in the substance, or even on the surface of the brain, fatal to life. You will also remark this difference betwixt that superficial and diffused ulceration, which, in cases of deadened bone, takes possession of the surface,

and that circumscribed abscess, which is formed within the substance of the brain: The former runs through all its stages silently, to the moment of the last fatal shiverings, without delirium, high fever, or any thing, but cold chills, a flushed cheek, a loaded feeling in the head, and a febrile pulse; while the latter, the internal abscess, is attended in its progress with torturing headaches, amounting to delirium, repeated paroxysms of fever, and dreadful pain, till, after some violent attack of such inflammation, the fatal effusion takes place.

When we investigate, by dissection, the various conditions of the inflamed brain, we find reason, from the visible changes in its structure, to conclude, that, MANIA is an affection of its whole substance, by which it is indurated; HYDROCEPHALUS an inflammation of its extensive surfaces, whence a sudden effusion of serum takes place; VOMICA a local abscess usually arising from some effusion of serum or blood, slighter than that which produces the paralytic stroke; SIDERATIO, PHRENITIS, an inflammation more intense, hurrying on to its fatal conclusion before serous effusion can take place, where, after death, inflamed surfaces, and turgid vessels, are formed and one portion of the brain suppurated in part, and partly gangrenous or blackened.

This slight and sketchy outline of the various degrees and species of inflammation of the brain, I shall endeavour to fill up in its due proportions, so as to vindicate in some degree the title I have prefixed to this discourse, "Illustrations of the Inflamed State of the Brain:" I shall first report, in a general way, what we usually observe in practice, and then complete the more interesting part of my narrative by stating particular cases and facts. My first and most earnest wish is, that your conceptions may be clear and decisive, correct and rational, not fantastical, but founded on facts and dissections: My next wish and care shall be, to leave you with free unbiassed minds, to follow the dictates of experience and nature, doubting, investigating, and correcting my opinions as you improve in knowledge; a task in which I shall, on my own part, be sincerely and conscientiously engaged.

One most pernicious, absurd, and ignorant practice, I am sure you will learn to hold in abhorrence, I mean the indiscreet and promiscuous use of emetics, which are unfortunately given chiefly where they are most dangerous, viz. in affections of the head: An emetic is given to every adult, and to every infant, suspected of a foul stomach, a bilious habit, an approaching fever, or any unknown disorder of the head; emetics are given chiefly when the danger consists in a sudden impulse of the blood

towards the brain, where a shock such as the concussion of vomiting occasions must be irresistible, and will indeed be more likely to prove fatal than an actual blow.

In describing Hydrocephalus, Phrenitis or Vomica, I mean not to lay before you an entire system, but to give you the elements of knowledge, afterwards to be improved by practice; and without any intention of entering again on a subject already discussed. Yet I cannot refrain from protesting once more against the folly and danger of refusing pathological definitions of disease and resorting to logical distinctions which cannot but mislead, of refusing in truth to know what is the cause of disease. The error of arrangement which leads to any kind of error in practice, should not be a matter of indifference, and in relation to hydrocephalus a very universal and dangerous error has prevailed: Dropsy of the brain is arranged with other dropsies *; and by one of the most modern and best esteemed nosologists, is defined, "A soft inelastic swelling of the whole head, with gaping of the sutures.†" This is not hydrocephalus, but mere Mal-conformation of the head, not unfrequent in the new born child; while hydrocephalus is in truth the inflamed headache of children, terminating in serous effusion: it is a febrile and sudden disease caused by insolation, running, wrestling, and violent sports, favoured by family predisposition, and peculiar irritability of the vascular system of the brain; beginning with poignant headache, sensibility to light, and a febrile pulse, and ending in stupor, palsy, and slight convulsions. It is a disease peculiar to children betwixt three and ten years of age; and although the symptoms of hydrocephalus, were I now to relate them simply, would prove that it is purely inflammation, I know no surer way of impressing this truth upon your mind, than demonstrating the relation this particular disease has to the headaches and inflamed brain of those advanced to years of manhood; to the effects of fungous and suppuration from fractures of the scull; to the consequences sometimes arising from blows, even from blows of the fist, for though the impetuous circulation and powerful arterial system of the adult and full grown man usually hurries on the inflammation to gangrene and a sudden death, yet, in the adult, hydrocephalus is neither impossible nor indeed unfrequent.

* This is the error which Gaudelius, in his dissertation on hydrocephalus, plunges into the very first sentence, "Hydrocephali tamen, tam externi quam interni causae non aliae esse possunt proximae, quam quae hydropem generatim inferre in corporibus humanis consuerunt," page 344. Quite the reverse! With other dropsies this has not the slightest analogy; hydrocephalus in place of being, as represented by this arrangement, a mere passive exudation, is a disease of a nature purely inflammatory, an exudation of serum into the ventricles of the brain, preceded by excruciating pain.

† Capitis intumescentia mollis, inelastica, hiantibus cranii suturis."—*Cullen.*

Mark now the conclusion which I have formed from experience, the point to which these illustrations tend, that you may accompany me fairly in my reasoning, and assent to the conclusions I mean to deduce from them. " Headache is fatal, only when it ends in hydrocephalus: headache and hydrocephalus stand in the same relation to each other with inflammation and serous exudation in other parts." Physicians, as if they were careful to be ignorant, and only afraid of knowing the real cause, pronounce headache to be a " Nervous Disease," a term to which I have never, since I was able to read, think, or observe, been able to annex the shadow of a meaning, correct or incorrect. Yet this is the common language of practice; this nervous headache is supposed to rise from a disordered stomach, this disorder of stomach is to be removed by an emetic; an emetic brings up something, and that something appears to be either half digested food, (no unnatural consequence of vomiting) or mucous and gastric juice if there be no food; or bile squeezed into the stomach by the spasmodic and general pressure produced by the throes and painful efforts of vomiting: the headache is then declared to proceed from indigestion, from phlegm, or from bile, a reasoning quite level to the capacities of the vulgar, and to the patient most acceptable, since seeing the said food, bile, or mucous discharged, he must be at once satisfied of the wisdom of his physician, and consoled by seeing himself relieved of the immediate cause of his disease. We have no reason to wonder that in our difficult science that happens, which is so frequent in all physical inquiry, viz. That concomitants are mistaken for causes: from this mistake is the stomach thus purged of its natural food, natural mucus, and not less natural bile, but not without great and manifest danger from hurrying the blood more rapidly to the head. These doctrines and practices have prevailed from the days of Galen, who says, " Frequentissimo etiam videmus, flava in ventriculo bile contenta, caput dolore affici: illa vero ejecta per vomitum, illico dolorem compesci *."

Headache is an inflammation of the brain slight and transitory in the degree in which we usually witness it, but often fatal when it amounts to that savage pain denoted by the formidable words, Hemicrania, Megrim, Cephalagia, and Cephalea. By recollecting the succession of the symptoms, we shall be satisfied that the sickness is not a concomitant of the headache, an accidental coincidence, but a direct consequence of the disorder of the brain, and of the sickness, vomiting, and langour, which accompany congestion of blood or inflammation of the brain from an internal cause, as invariably as they do a fall or a blow.

* De locis affectis, lib. iii Cap. iv.

Headache begins in the morning with a sense of sickness and langour, after a long and oppressed sleep, the pain and heaviness continually increasing, with pulsation of the temples and forehead: the headache increasing, the face is pale and the pulse small and rapid,* the eyes become enflamed and watery, with universal restlessness, intolerance of light, heat, and noise, and such exquisite sensibility of the whole frame, that the tread of the foot even in an adjoining chamber, or the rattling of a carriage along the pavement, drives the patient to destraction. Then, in the second stage, comes vomiting with a corded feeling, as if the temples and forehead were squeezed in a vice; giddiness, sickness at stomach, and profuse evacuations of bile; on the second or third day, the paroxysm ends, and the patient continues passing well, till the disease is renewed often from some very slight and hardly preceptible cause.

Assuredly the stomach affects the head, since it is into the stomach we receive those peculiar stimuli which excite the general circulation, and hurry the arterial action in the brain; and in enumerating the causes of disorders in the head, this must surely be the first, for the stomach is suspected of affecting the head only when a man has partaken of a feast, or indulged in what he knows agrees ill with the system, has gorged with rich and high seasoned food, or exceeded in wine. This fullness and foulness of the stomach, though in itself it may, it must offend, is dangerous only from the ill effects of such excitement upon the circulating system of the head.

What are the chief causes of headache? Feasting, dancing, music, lights, wine, noise, mirth, and revelry; the heat of public rooms, late hours, severe and protracted studies, intense thinking, agitation of mind, passion, altercations, and wrangling; all pleasurable and all painful excitements whatever, in short, accelerates the circulation or quickens the pulsation of the arteries of the head, causes this temporary and slighter inflammation of the brain. Headache is inseparable from all febrile disorders, and is, in proper fever, usually the most oppressive symptom; it is the precur-

* Dolor Capitis, a plethora oriundus cognoscitur ex signis generalibus plethorae, stipatur pulsu raro; semper enim observavi in gravibus capitis doloribus pulsum rarescere, nec *semper facies est rubicunda.*"—Sauvages. Let it be recollected, that inflammations of all the cavities, especially of the abdomen, are marked by smallness of the pulse; in extreme headache, the suffering seems to subdue the actions of the system, as pain of any kind when extreme causes paleness and fainting. During the period of intense headache, the face is pale, the cheek hallow, the eyes languid, and the pulse extremely small; but the pulse rises, and the features swell upon bleeding.

sor and the sequela of apoplexy and of epilepsy; it is produced by charcoal fumes, drowning, suffocation, asthma, cough, hysterical paroxysms; it accompanies all excesses and irregularities of menstruation; it is produced by travelling, working, hard riding; and is frequent during the heats of autumn, from exposure to the meridian sun. But most of all are we to regard as an irresistable cause, that habitual propensity to inflammation of the brain, which is marked by frequent headaches: Headache is the peculiar disease of some families, as diarrhoea or slight abdominal inflammation is in some constitutions, cough or pulmonic inflammation in others, is the disease of the habit.

We are not to conclude that headache, because it is a frequent, a transient, and a harmless disease, is not an inflammation of the brain; for we might, with equal reason, deny Opthalmia or Cynache to be inflammation of the eye or throat, because they do not destroy the organ or ulcerate or suppurate! Opthalmia arises from heat or light, and from long exertions of the organ; from the heats of summer; from protracted studies or vigils, from the dust and wind and reflection of the sun; and it is allayed by quiet rest and coolness: Opthalmia does not always suppurate nor cause ulcers of the cornea to deprive us of vision, and yet is not less an inflammation of the eye; so is headache, though it does not always terminate in delirium, or in watery effusion, an inflammation of the brain: the most trivial headache is a degree of the same disease with the most violent, though it do not torture the patient into delirium, deprive him altogether of reason, nor end in effusion and palsy. The eyes are sometimes dazzled, sometimes irrecoverably inflamed by heat and light; the brain, in like manner, is sometimes slightly affected by excesses, sometimes deeply inflamed. How very closely the slightest headache is allied with the more persevering and desperate inflammation, how invariably this disease ends in serous effusion, the facts I have next to relate to you will prove. Even those headaches which seem little alarming, and in which, because of their frequent return, the patient is little pitied or cared for, I have often seen terminate in a degree of stupor, constipation, double vision, squinting, and other signs which to my apprehension intimate plainly that partial effusions do sometimes take place, and are reabsorbed. But habitual, persevering, and very violent headaches, increasing in years, confining the patient to bed during the paroxysm, attended with bilious vomitings and severe sickness, are as surely attended with effusion of serum as rheumatism is with swelling of the inflamed joint: we see such headaches depressing the spirits, hurting the memory; extenuating the body, and destroying the health; causing gray hairs and a broken constitution early in life.

Unwilling as we may be to represent this very trivial disorder, as a degree of the most dangerous disease, we must speak our opinion truly and plainly; we must not continue to deceive ourselves by describing headache by the unmeaning terms *Nervous*, intimating some confused belief, that the disease proceeds from exhausted strength, from debility, while the causes just enumerated prove its nature, and such deliberate reasoners and sound thinkers as Haller, Wepfer, and others, men well acquainted with the structure and morbid affections of each separate organ, pronounce this an inflammation of the brain. "Maxime dolores capitis visi sunt nasci, (says Haller), a cortice cerebri inflammato *.

The opinion of Haller is vindicated, in my poor judgment, by every fact in common practice; but the writings of Bonetus will best convince you, that inflammation of the substance or surfaces of the brain is inseparable from headache, and serous exudation from every high inflammation. His book, De Dolore Capitis, seems a simple and convincing illustration of this doctrine, that "headache is inflammation:" You are strongly persuaded of this while perusing his facts and narratives; it is only when you read his notes, enriched with many antiquated doctrines, relating, like those of Willis, to the ill qualities of extravasated serum, thickened nervous juices, obstructed tubes, and impeded actions of the fibres of the brain, that your doubts return. "A merchant, travelling at the principal fairs in Switzerland during the intense heats of summer, was seized with intolerable headaches, and was at last forced to stop in the Canton of Berne, and betake himself to bed: I bled him (says Bonetus) from the ancle, the arm, the veins behind his ears, and on the forehead, with leeches with cupping-glasses, in short in every possible way, and would not have spared the temporal arteries had there been a surgeon at hand fit to perform the operation. The patient however, without any change of symptoms, died on the fourth day. Upon raising the cranium, the veins of the brain and dura mater were found very turgid with blood, the scull seemed hardly to contain the brain, and the membranes seemed blackened, so full were they of blood: there was found in the anterior part of the brain, a small abscess, of the bulk of an almond, full of serum, bursting upon the slightest touch." This is a form of exudation very unusual, and strongly indicating the intense circulation in the brain: but from inflammation so long continued violent, we usually find, in place of such local effusion or watery abscess, a great exudation into the ventricles, or a general one on all the surfaces of the brain.

* Haller. El. Phisiolog. tom. iv. lib. 10. sect. 7.

"A. Taylor, 35 years of age, of a warm and bilious temperament, moderate in his way of life, but prone to passion, fell into a dreadful pain of the forehead, gravating, oppressive and lacerating; but so limited was the seat of this pain, the upper part of the head was not at all affected: There was no fever, the pulse was slow, like that of a melancholic, he was otherwise in perfect health; but from this pain came watching, delirium at times, and then again a sleep, or rather stupor so deep, that you might have torn him to pieces without his being roused, till he awakened naturally, and then there was no remission of the pain, which continued till the 14th on which day he expired without a struggle." Here also the blood vessels of the dura mater were turgid, the brain burst from the cranium as too narrow to contain it; in the anterior ventricles were found eight ounces of serum, and the choroid plexus were bleached and colourless *.

Bonetus supposes that, in such a case as this, after each paroxysm of anger, proportioned effusions of serum take place, and successive additions to what is effused; but every future variety of the disease will prove to you that exudation is the immediate and instant consequence of inflammation, that such exudation takes place in a few days, I had almost said in a few hours illness: dissections such as this, must always be interesting, but hardly is there one more so than that of a young man, a student, who having for a fortnight been afflicted with incessant intense headache, fell into a fever, attended with watchfulness, convulsive motions, and delirium, and died, notwithstanding blisters and repeated bleedings. †" The head being opened, the

* Mortuo aperio caput, ecce vasa turgent in Meningi bus cranium nimiam cerebri molem non poterat capere. Interiora rimando, occurrunt in ventriculis anterioribus unciae viii seri flavi et plexus choroides sub albicanus.

† Nec minus à phlegmone, et abscessu, quam ab hujusmodi meningum nodis, et tuberculis nonnunquam cephalalgiae lethales, aut incurabiles oriuntur. Olim juvenis Academicus cum per duas septimanas de gravsssimo capitis dolore ipsum incessanter affligente conquestus, erat tandem febre aucta, mox vigiliae, motus convulsivi, ac confabulatio delira succedebant; quo tempore medicus accersitus, phlebotomia enematis, emplastris, revulsivis, vesicatoriis, item remediis internis, quae ffuxionem sanguinis, ac humorem à capite devocent, sedulo adhibitia, nihil proficere potuit, quin mors brevi successerit. Calvaria aperta, vasa meningas obducentia erant sanguine repleta, et plurimum distenta, quasi cruoris massa illuc tota confluxerat, ita ut sinubus dissectis, et apertis, cruor affatim erumpens, ad plures uncias, supra lib. ii. pondus effluxerit: porro ipsae membranae tumore phlegmonoide per totum affectae, discolores apparebant: integumentis hisce sublatis, cerebri anfractus omnes, ejusque ventriculi, aqua limpida erant pleni, ejusque substantia, utpore nimis irrigata, madida erat, et minus

the vessels even on the membranes of the brain seemed crammed, as if the whole blood of the body had flowed towards the brain, insomuch that, the sinuses being opened, blood burst out, and nearly a pound flowed from them; the membranes moreover were universally inflamed and discoloured, and when they were raised up, the convolutions of the brain were seen inundated with water: the ventricles were full of limpid water, while its very substance, as if infiltrated with serum, was moist and soft."

"A noble lady, who had for many years suffered under a variety of disorders, and been occasionally afflicted with spasmodic affections, complained of great heaviness and pain of the head; she was suddenly struck, at midnight, while buried in sleep, with convulsions followed by fatal apoplexy. Upon dissecting the head, and removing the skull-cap, the vessels of the dura mater and brain were seen distended with blood, while, in cutting into the other cavities and parts of the body, hardly any blood flowed: upon removing the dura mater, there was seen, under the more delicate pia mater, in every fold of the membrane, round every convolution of the brain, a profusion of limpid serum, while the same serous effusion filled all cavities and recesses of the brain: the choroid plexus seemed white, bleached like, and almost corrupted.*" A consultation of Balonius puts this effect of vascular action in the clearest point of view, demonstrates how inseparable febrile delirium, or coma, and watery effusion into the ventricles of the brain, are from one another, explains what I have said of the connection of delirium and fever, and shows the analogy betwixt the headaches of the adult and the hydrocephalus in the child. "A young man, being struck with violent headache about the middle of the month

firma. Procul dubio in hoc casu sanguinis *effervescentis in meningas incursus*, ejusque ibidem aggestio, phlegmonem *excitans, cephalalgiae, et subsequentis delirii causa fuit.*——*Willis, p.* 156.

* "Domina Perillustris per multos annos affectibus spasmodicis obnoxia, variosque et diversos perpessa, de capitis dolore et gravitate insigni conquesta, cum circa initium noctis alte dormiverat, expergefacta in paroxysmum convulsivum incidit, qui statim in Apoplexiam lethalem transiit.

"Ejus calvaria exempta, vasas meningas et cerebrum perreptantia sanguine plena et distenta apparebant, cum in reliquo corpore inter dissecandum vix quicquam sanguinis effluxerat: Meninge crassiore amota, pet alteram tenuem et pellucidam, aqua limpida cerebri plicas et anfractus implens, ejusque totam compagem quasi inundans cernebatur; revera omnes cerebri cavitates et recessus colluvies serosa impleverat: Plexus choroeides aquae diu immersus, et velut elixus discolor et semicorruptus evaserat. *Willis, Pathol. Cerebri. cap.* x.

of October, died on the 40th day: along with his headache there was an obscure fever, but such as he himself was not conscious of: while he went about as usual, and lived a careless and irregular life, the fever increased, and with the fever the headache, till, careless as he was, and fearless of consequences, he was entirely confined to bed. Neither the pulse nor the urine corresponded with the headache nor fever: the viscera were in some degree, but the head conspicuously, inflamed, the eye glaring, the face, and especially the cheeks, reddened; the headache was seated chiefly in the occiput; the bowels were costive, so that not the slightest motion was procured but by medicine; every symptom was aggravated during the night, which was spent in great confusion, clamour, agitation, occasional delirium, and unbecoming postures of the limbs and body; then intervals of reason occurred with returning delirium, and at last sleep, so profound and deep that he could hardly be roused from it, coma vigil, and all kinds of irregular symptoms: sometimes he lay lethargic, sometimes raved, till at last the eyes became fixed and staring, as in universal convulsion, the low and mild delirium succeeded, the right side was stiffened with spasms, followed by a paralytic state; while, from the symptoms growing milder, and the occasional success of our remedies, we began to indulge better hopes, but the disease increased, the pains returned, and he expired on the 40th day.

"Upon opening the head, the veins seemed varicose, distended with black and putrid blood; much water was found in the middle ventricle; the medullary substance of the brain, soft and friable by nature, seemed dry, and its membranes still drier, so that they were actually rigid, could not be torn as usual, nor were they even easily cut, but withstood the edge of the knife*." This fever plainly had arisen from the inflammation of the brain,

* "Aperto capite venae quasi varicosae, tabo et sanguine nigro turgentes videntur: Item observatum in ventriculo medio serum multum: medulla cerebri, quae mollior et friabilis esse debet, siccior: membranae siccissimae, quasi per siriasin et deflagrationem arefactae et rigentes, vix lacerabantur, vix novacula praecidebantur, acutiei secantis resistentes: imo sectae crepabant more membranarum arietinarum atque occalescentiam: pulmonis partes dextrae lateri adhaesu contumaciore, lacerabiles nectebantur plenae vomicis tabo et pure scatentibus: haec reliqua ex gravi peripneumonia, quae anno praeterito illum oppressit ac pene consumpsit: Hepar labem conceperat, sed non maximam qualem pulmo. *Ballonius, lib.* 3. *cons.* 71.

This singular and instructive case and dissection is taken from Ballonius, an author who is confoundedly learned, and not less ingenious than learned; for I find him prescribing for an impotent

which was the idiopathic disease, the fever both Bonet and Balonius designate by the term "Febris vere Cephalice Typhoides." The accession of fever after pain, the alternations of delirium and coma, the close of this delirious stage in low muttering, make the narrative highly interesting: The brain was hardened by the long continued action of its vessels, as it always is in mania, which is a slower, less unnatural, less disorganizing action than that of headache: the serum effused, shews how invariably this phenomenon takes place in inflammation, and completes the parallel, I proposed to establish, betwixt the headache of adults, and the hydrocephalus of younger subjects, whose vascular brain is more succulent, more delicate, more disposed to exudation.

If headache or simple inflammation be thus followed by serous effusion, much more must that degree which ends in ulceration either on the surfaces or in the cavities of the brain. The following dissection by Ilmer, where, in consequence of inflammation and slight ulceration of the brain, there was a great effusion of serum, corresponds with that of the boy just quoted, and with all the dissections I have ever performed or witnessed. "A nobleman, 46 years of age, fell ill, four days before the summer solstice, of a heavy, tense, and lacerating pain, affecting all the upper and fore parts of the head, followed by continual watchfulness: eight days passed in this distress, with occasional delirium, but always the delirium was mild, gentle, and never furious; the day preceding his death, his whole body was agitated with slight convulsions. We could not, during the whole of this period, perceive the slightest sign of heat or fever, slight nor violent, idiopathic nor symptomatic, except on the day preceding his death, when the convulsive motions seemed to create a degree of fever in the pulse, which for ten days beat slow and languid like that of a melancholic person."

"To discover the cause of such unremiting headaches, I opened the cranium, and found, first, the veins and arteries of the dura and pia mater full of black blood, and those of the brain itself distended in the manner I have usually observed in those who have died convulsed or passionate: secondly, under the middle of the right parietal bone, extending from the falx to the temporal suture, I found an oblong ulcer, with thick and yellow matter: thirdly, in the cavities or ventricles of the

young man, that he should be well fed with the BRAINS of SPARROWS! Surely if that did not put notions in his head, nothing could.

brain, I found twelve ounces of limpid serum: fourthly, the right choroid plexus was somewhat ulcerated and corrupted," &c.*

Serous exudation takes place from the inflamed surfaces, in a degree proportioned to that of the vascular action; sometimes in four days, sometimes in fourteen, (the usual period in hydrocephalus,) sometimes in thirty or forty days, as in the case of febrile headache just narrated: sometimes habitual and chronic headaches, severe and oppressive while they last, but returning at great and distant intervals of time, are followed by effusion of serum in quantities almost incredible.

" A noble lady, (says Mr Bailly), who had, during her early years, been subject to haemorrhoidal discharges, had, from her eighteenth year, been afflicted with hemicrania affecting all the anterior and left part of the head, and returning with violence once a week. By the use of smart purges, the paroxysms were sometimes warded off for fifteen or twenty days. When the pain ceased, the eye of the affected side poured out a profusion of tears, a sure and acceptable sign to her that her disorder was about to cease. After her death there was found in all the cavities or ventricles, anterior as well as posterior, and in all the doublings of the falx and dura mater, a saltish and yellow coloured serum to the amount of a pint, or nearly five pounds apothecaries measure."

We have been gradually approaching to the legitimate and direct evidence of that fact, which needs only to be clearly proved to become extremely interesting, viz. That the severe headache of the adult is but a slower hydrocephalus; and the converse, that hydrocephalus is that effusion of serum, and consequent stupor, which invariably follows inflammation of the brain. " Jacobus Reutinger, (says Bonetus), was a man of

* " Ut igitur cognosceretur causa tam pertinacis doloris, mortuo aperio caput, et ecce reperio, 1. venas arteriasque durae et piae meningis turgentes plenasque nigro sanguine, ac ita particularem vasorum capitis repletionem, uti saepius in convulsis et iratis observavi. 2. Sub medio ossis sincipitis dextri, a processu falcato usque ad os temporis, extensum video ulcus oblongum cum sanie crassa et multum flava, quod ego habui pro maligno, quia ante aliquot annos a pharmacopaeo sciolo, in curatione gonorrhaeae exhibita fuerant mercurialia, forte non bene praeparata: 3. Interiora cerebri rimando, ventriculis anterioribus uncias xii. seri limpidissimi occurrebant: 4. Plexus choroideus nonnihil erat arrosus et putrefactus; inquisivi quoque in vasa lymphatica cerebri, sed ut ea viderem tam lynceus non fui: 5. In pectore aperto, pulmones dextri lateris duplo erant majores solito, unde forsan causa quod aeger semper in dextrum latus, etiam invitus decubuerit; sinistri verò, a sterno usque ad spinam dorsi, ita pleurae et costis accreverunt, ut judicarem eos mille clavis affixos, sanie, pure et scirrhis; cor autem optime constitutum." *Ex Observat. D. Frederici Ferdinandi Illmeri Medici in Wartemberg. in Miscell. curiosis anni* 1670.

about fifty years of age, of a hot adust temperament, of a tawney complexion, a fleshy form, with crisp black hair, thin and bald on one side of his head from his boyish years, extremely irascible in his temper: he lived by the hardest labour, being employed chiefly about vineyards : he was much addicted to drinking, and rarely scrupled, when thirsty from labour, to cool and moisten his parched viscera with wine: The colour of his pimply face plainly told the tale, (et non raro sicca labore, pectora fervido maduisse mero visum fuisse gutta rosacea, quae faciem foedabat, fidem fecit): It were trivial to inquire, (says Bonetus), impossible indeed to learn, the diseases to which such a person had been subject during a life so irregular, but this I knew, (for he had applied for my advice), that he had for some months been tortured with a cruel heart-burn, which had been cured by purges and stomachic bitters, but which returned from misery, hunger, and the necessity of eating the vilest food. Ill satisfied with my poor advice, he consulted the hangman, whose cures consisted of prayers, or, as I fear, of incantations, which the vulgar regard as their last refuge, and never scruple at the most shocking impieties. For some weeks before his death, this man endured excruciating pains shooting through the head, unremitting, seated chiefly in the forehead and occiput: wearied of medicines, he used only some old woman's plasters outwardly; at times he was desperate and frantic with the pain, unconscious what he said or did. For three weeks before his death, he was entirely blind of a proper gutta serena, without the slightest apparent defect in the eye,"

" At this time, the excruciating pain ceased, but there remained such extreme anxiety, that he tossed from side to side in his bed, nor was he in a condition to acoount for this anxiety and restlessness: fourteen days before his death, he began to wet the bed; and in a few days, there succeeded to this paralysis of the bladder a palsy first of the right side, and then of the left. During the four days preceding his death, he lay buried in a profound apoplexy, void of sense or motion; nothing we could do excited the least sign of feeling; he perspired profusely, and snored continually : during all his illness he was free from fever."

" On the day after his death, I dissected the head, (says Bonetus): upon opening the dura mater, a pale and yellowish serum flowed out with a jet like that of blood flowing from the median vein in bleeding, and in such profusion, that you might have filled from the stream several ounce measures. This serum was collected chiefly in the space betwixt the dura and pia mater; a space which, in this subject, seemed greatly enlarged by the serum, at once dilating the dura

mater wherever that was possible, and compressing the cerebellum and brain. There was an equal quantity of serum collected betwixt the pia mater, and around the convalutions of the brain and cerebellum, so that each convolution and sulcus seemed surrounded by gelatinous globes, but these, when divided by the knife, poured out the same kind of limpid serum with that which occupied the space betwixt the membranes. Nay, the very substance of the brain and cerebellum seemed soaked and infiltrated with serum, both being soft, flaccid, and like a poultice, so that the slightest touch broke down their structure. In all the ventricles was found the same serum: upon pressing the cerebellum, much serum regurgitated into the third ventricle: the choroid plexuses were livid, bloodless, and studded with many hardish varicose-like tumors; and upon dividing the medulla oblongata, taking out the cerebellum and brain, and inclining the head, much serum ran from the occipital hole, so that I doubt not the whole spinal canal was full of water. Such a disease (says Bonetus) I feel no difficulty in pronouncing to be a species of hydrocephalus, a dropsy of the brain."

I will not leave you on this occasion entirely to your own reflections, but will suggest my own: Here you have external signs so curiously connected with the actual state of the organ, that having once resolved this case into its principles, every similar case will be quite intelligible. You will naturally remark that these phenomena must be ranked under one of two designations, either common HEADACHE terminating in hydrocephalus, or HYDROCEPHALUS occurring in an adult of fifty years of age. In this person an unhappy and irascible temper, conjoined with an irregular life, working severely in the vineyards in the hottest season of the year, frequent intoxication, together with poor and scanty food operating on a habit coarse, strong, and predisposed to inflammation, brought on severe headaches. But headache is a trivial disease; we are indifferent to its approach; we fear no fatal consequences; it seldom enters into our imagination that the patient may die; the sensible and judicious prognostic of Willis, where he says, "Headache, whether continued or remitting, if it be excessive, accompanied with vomiting, vertigo, convulsive disorders, or stupor, is never void of danger, but often ends in apoplexy, epilepsy, palsy, deafness, or blindness, and other fatal or at least incurable diseases,"† is quite

* *Dolore capitis* sive *continuus*, sive *periodicus*, si immanis fuerit, atque vertiginem, vomitionem, aliosque affectus aut convulsivos, aut soporosos adjunctos habuerit, periculi magni suspicionem praebet: utpote qui saepe in *Apoplexiam* lethalem et non raro in *Epilepsiam*, *Paralysim*, *caecitatem*, *surditatem*, aliosque morbos aut *funestos* aut *incurabiles* transit.

forgotten, and when the headache ends in delirium, delirium in stupor, and stupor in palsy, and the patient, contrary to all expectation, dies, we can hardly believe that such complicated distress has proceeded to its fatal period without being produced by tumor or abscess, extravasation of blood, or some conspicuous and proportioned disorder of the brain; we cannot prevail with ourselves to believe that the patient dies so horrible a death in consequence of mere inflammation with consequent effusion of serum.

This being a true and faithful picture of the usual indifference to this terrible malady, the case now before us must be extremely interesting. We affect not to explain its phenomena by any curious description of the courses direct or retrograde, rapid or obstructed, of the nervous fluid or animal spirits, nor by showing how these encounter, oppose, and obstruct each others course, or prevent the mutual egress or ingress of spirits and nervous fluid, but proceed to trace and ascertain a plain correspondence betwixt certain states of the sensorium and the condition of the organ. In this poor creature's case, we have first, corresponding in point of time with the period of inflammation, excruciating unremitting pain, delirium and fury, the patient desperate and frantic with suffering, and unconscious of his extravagance in words and actions. Secondly, corresponding with the period of serous effusion, we have, for three weeks preceding his death, total blindness from gutta serena, with tossing, restlessness, and stupor. Thirdly, we remark a period during which all the powers of mind and body are successively and gradually abolished; this period extends to fourteen days; the urine first passes without consciousness, the right leg first, and then the left becomes paralytic, the stupor increases, and a death-like stillness prevails, from which he can be roused by no excitement; he expires snoring and apoplectic; and there is found after death, no kind of disorder, but watery effusion! water on the surface, water in the ventricles, water within the substance, as well as round the convolutions of the cerebellum and brain.

Study this subject with that industry which it well deserves; look through the collected cases of Bonetus, Leiutaud, Morgagni, and Wepfer, and you will find a new and interesting scene open upon you: you will find headache not a mere symptom, an irregular affection, a nervous disorder, but a definite and most serious disease: you will find every proof you could desire of its arising from an inflamed state of the brain: you will not have one slight or lingering doubt of the essential unity of headache and hydrocephalus, or in other terms of inflammation and serous effusion,

nor the slightest doubt of the serous effusion being a mere symptom: you will find every proof you could desire in the very titles of the several histories, accompanied however with this strange perversion of the sense of each case, viz. that the serous effusion is stated as the cause. The several varieties of the disorder are thus distinguished: "A cephalagia from effusion of serum," "Hemicrania from a vast effusion of serum betwixt the dura and pia mater," or, "Cephalea from water confined within the ventricles of the brain." ("Cephalea a sero cohibito in Cerebri Ventriculis,") or, "Cephalagia from a profusion of water within the head, the transudation of it through the ears being interrupted.*" Thus is the disorder imputed in the title and in the scholia upon each case to the acrimony, to the quantity, or to the confinement of the serum; and every thing perverted except the immutable facts, of pain implying inflammation, inflammation being accompanied with effusion, and effusion causing stupor: So far have pathologists mistaken the nature of the existing disease, as to wonder how such cruel symptoms could be produced by so small a quantity of water. "Exiguam adeo aquae quantitatem (cochlearia tria,) dolorem intulisse mirum videre polerit; sed salsam illam, fuisse, acrem, muriaticam, vel acidam ostendunt subsequutae convulsiones †."

Regarded as a *cause*, three spoonfuls of water must seem greatly inadequate to produce any ill effect, and that it should excite convulsions, is a circumstance which even its saline and acidulous tendency cannot entirely explain; but as a *consequence*, it is sufficient to imply that intensity of inflammation which proves fatal. Were you to be at more pains, than ever I have been, to analyse cases of headache, attended with long-suffering and death, were you to mark down all its possible causes, Fungus, Inflamed Membranes, Tumors, Schirrus, abscess of the substance of the brain, diseases of the pineal gland! taking all organic disorders in cumulo, you would not find half the number of fatal headaches produced by all the others that you would find proceeding from simple inflammation accompanied with a limpid and purely serous effusion.

There is, you perceive, much subject of observation on the margin of a book, as there is often much of opinion and doctrine expressed in a simple term. Hydrocephalus is the headache of children ending in serous effusion; hence authors have not been always aware when they were describing hydrocephalus, but have imagined themselves describing a natural headache proceeding from cold, from fever, from an emetic im-

* "Cephalagia ab aquae copia in capite, ob evaporationem per aures susceptas."

† Bonetus, page 15.

prudently given, from a fall or a blow! But, whatever the first cause, the disease is inflammation, the final disorder serous effusion. The disease is sometimes designated "Death from a cold abscess," "Death from a serous abscess in the brain," "Headache in a boy from effusion of serum;" sometimes "Lethargy from serum, to the quantity of a pound, occuping the right ventricle of the brain;" sometimes, "Lethargic sleep from serum stagnating about the Medulla Oblongata and Basis Cerebri." Sometimes it is described as "A pungent pain of the head from limpid serum collected in the posterior ventricles of the brain." One thing is especially worthy of remark, that even in those cases where authors particularly declare, that there was no inflammation, that the disease was wholly caused by serum, we have every proof we could desire, that the exudation had been a mere consequence of the inflamed state of the surfaces, preceded by every sign of inflammation, as in the following narrative, taken from Coiter, and intitled, "*Phrenitis, with an uninflamed brain, caused by a serous effusion in various parts of the cerebrum.*"

"In August of the year 1567, a woman, after deep affliction, was seized with pain in the head and burning fever, followed by phrenzy, so that she was supposed by the vulgar to be struck with the plague; every symptom attested the cause of this phrenzy to be an ebulition of the blood: she laughed, joked, sung, and in every way, and by all her manner and gestures, testified great hilarity; still she answered questions, though sometimes she refused, and often she raised her hand to her head as if intimating that there lay her pain: she was early bled and purged; the blood was crude and serous; she recovered her intellect for a little, and then expired."

"Upon opening the head, a serum like the washings of flesh first flowed out. The vessels of the pia mater and of the choroid plexus were turgid with a thin watery blood; both ventricles were found equally full of water: not a speck of inflammation was to be seen in the membranes nor in the substance of the brain. From the sinuses of the dura mater, I drew out, as from those of the hanged and suffocated, long stringy coagula consisting of pale mucous like worms.*"

* Anno 1567, mense Augusto, Mulier ex ingenti animi moerore, febri ardenti cum capitis dolore, cui postea Phrenesis supervenit, correpta, vulgus duxit Hungaricum illum morbum fuisse: Signa omnia attestabantur hanc Phr. ex sanguine, fuisse, ridebat, jocabatur cantabat, omnibusque gestibusque hilaritatem exhibebat: interim ad interrogata responsum dedit, aliquando non; frequenter manum capiti, tanquam istic dolorem persentisceret, admovebat: Tempestivè fuit levibus medicamentis purgata et venae secta; sanguis erat majori ex parte pituitosus, crudus et serosus: tandem resipuit et paulò post obiit.-Aperui caput: dum serra cranium removebam, effluxit aqua loturae carnium similis: Tenuis

I would instruct you to register blows, falls, insolation, hard running at games, fever, and such irregularities and accidents as school boys are subject to, among the most frequent causes of water in the head, which begins usually like a headache, sometimes like a cold, sometimes like fever, and very often among school-boys follows a boxing match or a blow, of which I think it right to lay before you at least one example.

" Example of *Lethargy*, (so it is entitled in the original,) from serum to the amount of a pound occupying the right ventricle of the brain."—" A boy of fourteen years of age, about two months before his death, fell from a height, hurt his head, and was rolled home by his school-fellows in a wheel-barrow; he fell into a fever; a quack was first of all consulted, and at last I was called. I found the boy a little feverish, stupid, drunk-like, and reeling, without thirst, but complaining of his head, which was yet neither red nor inflamed: soon after this he was struck mute with closed eye-lids and a grinding of the teeth: glysters, cupping, and the usual remedies were practised in vain, and though he occasionally spoke or muttered, he presently became dumb again, and soon expired." " Upon opening the body (says Coiter) I found an adhesion of the lungs and liver to each other on the right side. The right ventricle of the brain contained a pound of serum, to which solely is the Lethargy to be ascribed." Since a blow upon the head can thus excite inflammation followed by effusion, we can find no difference (the delicacy and importance of the organ excepted) betwixt an inflammation and effusion of serum in the brain, and inflammation and effusion of serum into the coats of the testicle from a blow, the most ordinary cause of hydrocele.

" A lively and pleasant boy about eleven years of age, of a good habit of body, was seized, after eating fruit greedily, with excessive vomiting and tormina, immediately followed with headache and fever; and his parents fearing an abscess of the brain, which had already carried off several of their children with a discharge of matter from the ear, called a Parisian physician, the usual attendant of the family, by whom various medicines, external and internal, were prescribed. But the boy was on the ninth day of the disease seized with stupor and expired."

membranae et plexus choroidis vasa aquoso et pituitoso sanguine turgebant: uterque ventriculus, tam dexter quàm sinister, plenus aqua fuit inventus: Nullam nec in membranis, nec in cerebri substantia deprehendere quivi inflammationem: Ex sinibus durae membranae cerebri, ut alia sex suspendio enecatorum cerebris, extraxi fibras, seu filamenta crassa, lumbricis non dissimilia, ex alba pituia conflata; Similes sumpsi ex cordis ventriculis.—*Volch. Coiter. lib. Observat. Anatom.*

" Peierius dissected the body in the presence of Du Verney. Upon raising the scull-cap, no vestige of abscess was found in the brain, nor was there any thing of that disorder which Willis in his Pathology describes as frequent in the brain of the lethargic. All appeared sound, except at the basis of the brain, and especially about the medulla oblongata and spinalis, where there was an effusion of yellowish stagnant serum, with which we filled three table spoons."

I do not think I could easily select for you a purer case of inflammation of the brain, (a disease to which all the children of this family seem to have been liable, and of which many of them had died,) a case where the persuasion was so absolute of there being an abscess in the substance of the brain, or a search more accurate or anxious, for whatever might be wrong, or by anatomists better qualified for the task: the inflammation was simple, effusion was the sole consequence: we see here how from mere inflammation unaccompanied either with abscess or gangrene, the patient may be cut off: the disease came all within the natural period of hydrocephalus, and was accompanied with its principal symptoms.

We have reason to believe that this boy's disease arose in part from fever, but have no doubt that excessive vomiting, artificial or natural, is often a principal cause. Whatever excites inflammation of the Schneiderian membrane, the lungs, the teeth, &c. is apt to excite inflammation of the brain: we cannot doubt that taking cold is a frequent cause of this disease: we see school-boys who are suddenly cooled after being heated with running, affected with inflammation of the brain; but we are never so sure of the circumstances which immediately produce the disorder as when all the little ones of a family are variously affected by one cause. " The little children of Michael Tremuleus were intrusted to the care of a senseless servant girl, who, in the dusk of the evening, draggled them through the streets and suburbs of the city; they were heated because they had not yet left off their winter habits, and with open and perspiring pores, they were made to puddle through streets floated with rain, and in the chill of the evening. One of the little sisters was seized next morning with toothache and pain of the jaws, another with cough, a third with continued fever, with frequent exacerbations, especially in the evening. This fever was accompanied with a lethargic stupor, a singular flushing of the cheeks, approaching during the paroxysms to absolute livor, and vomiting in the commencement of the disease: there was cough also, but neither painful nor frequent, nor was the breathing much oppressed: the eyes were insensible and the eye-lids close: at intervals, the eye-lids were raised, but there was no winking when the hand was pas-

sed before the eyes; the eye-lids were livid: and it was plain that the child was blind, and death fast approaching. The child died on the 12th day; and for twelve hours before it expired, the defluxion seemed to have fallen down upon the breast, and the swallowing was interrupted."

"The body being opened next day; after discovering an abscess and incipient gangrene (marked by livor and blackness in the lungs,) the head was opened to discover the cause of the lethargy and stupor. The brain was found more turgid, and higher than usual, so that not the smallest space was left betwixt the brain, and dura mater; and upon raising the dura mater, drawing out the falx, and observing the sinus, and separating the right from the left hemisphere of the brain there presented itself betwixt the cortical substance and the corpus callosum, a colourless abscess *, which burst upon the very slightest touch of the finger, and poured out a lymphatic fluid with a full jet. This clear and limpid fluid, which was plainly watery, must have amounted, according to the most modest calculation, to at least eight or nine ounces†."—The febrile inflammation produced in each of these

* This is what pathologists have thought fit to denominate *a cold abscess* or serous abscess, a term altogether unmeaning, or, at least, inconsistent in the little meaning it has; and fit only to be used, as Bonetus expresses himself, for the purpose of satisfying the vulgar.

† Anno 1679 Martio mense exeunte: Imprudens ancilla cujus cura commissi liberi tenelli, instante vespertino crepusculo per urbis pomoeria circumduxit, frigidiusculoque jam aëre, quem exceperunt excalefacto corpore partim quod hybernas vestes nondum exuissent, partim quod vix à pregressis imbribus lutosam viam eluctati essent: hinc postridie puellus de dentium dolore, conqueritur, Sororum altera tussi corripitur, tertiam febris continua invadit, sed quae pluries singulis diebus exacerbabatur, presertim instantibus vespertinis horis: Febris comites, fuerunt, Sopor-lethargicus, insignis genarum rubor per exacerbationes, ad livorem accedens, vomitus morbi initio; Tussis, sed neque frequens neque molestis, respiratio non multum difficilis; oculos obnubilatio et pupillarum concidentia occepavit, quos ex intervallis, diducebat, sed inconniventes erant oculi etsi manus admoveretur, ut visus privationis non minor quam mortis metus immineret: Palpebre livore tincte erant. Duodecim ante obitum horis, qui xii. morbi die contingit, catarrhus, ab exoluto cerebri tono, preceps in pectus ferebatur: Deglutitio preterea difficilis fuit, quae à chirurgo tonsillarum tumori adscripta fuit, etsi ore hiante, etiam ope speculi oris, nihil vitii deprehendere licuerit, ut neque post obitum aperto corpore.

Porro ut de soporis causa amplius constaret, quem ab inflammatione pulmonum aliquando suscitari alibi ostensum, *cerebri claustra quoque diruta, cujus suturae arctiori compagne quam pro aetatis ratione conjungebatur: Cerebrum autem tumentis et elatius observatum*, adeo ut inter membranam duram id obtegentem spatii nihil intercederet: qua distracta, dum ejus sinus et falx inquiruntur, diductaque cerebri parte laeva a dextra, inter corticem et callosum corpus, occurrit Abscessus candicans, ad levessimum digiti attactum disruptus, lympha, inde magno impetu exiliente, limpidissimus enim et plane aqueus humor effusus est, et ut aestimare licuit, ad unciarum octo vel novem pondus; Lethargi per compressionem cerebri et liberae spirituum distributionem impeditam causa.

little creatures by the same careless and unfeeling treatment, was established, in one in the teeth and jaws, in another in the lungs producing cough, in a third in both lungs and brain, that of the brain proving fatal: and it terminated in a pure and simple effusion of serum with that blindness characteristic of water in the head. The clear abscess, described upon separating the two hemispheres of the brain, was plainly the bursting of the thin and much distended ventricles: the age of the child, the cause, the symptoms, and every thing but the title of the case, announce it to be a pure and simple Hydrocephalus.

Examples of such a disease derive a sort of importance from their frequency, and from the uniform tenure of the symptoms, and thence I feel not unwilling to quote again and again the same fact in various forms; but there is one impression I do wish to leave on your minds clear and undisturbed by adventitious circumstances, viz. The uniform tendency of that disease to serous effusion in children which in adults ends often in gangrene or suppuration; I wish also to prove to you how very rapidly the effusion takes place. "I was present (says Bonetus) at the dissection of a boy in the foundling hospital of Geneva, whose head was opened by Mr Bailly. He was a boy of a lively wit, slender, playful, about five years of age; his illness lasted only four days: his first disorder was a pain in the head with a slight fever: on the third day of his disorder, he howled all night long like a dog, with strange tossing and agitation of his arms: during the day he was more composed, but his babbling talk was incessant and unintelligible, so that the attendants believed him possessed, and were ready to swear they heard him speaking Latin and Greek."

"All the viscera being carefully examined after death, nothing appeared to explain his strange disease and sudden exit, till, the head being opened and the scull-cap raised, the brain started out, so that the cranium being laid down again, the brain could by no means be repressed, nor the upper part of the cranium made to meet again with the cut edges of the scull: The marks of the lambdoidal and sagittal sutures were deeply impressed upon the corresponding parts of the dura mater; the veins of both dura

* Anno 1677, 14. mense Maii, dissectus est puer annorum quinque à Magistro Bailly Nosodochii Genevae Chirurgo periit. in Orphanotrophio, me praesente et D. D. de Communis Nosodochii Medico Praestantissimo. Vividi erat ingenii puer, agilis, macilentus, qui per quatriduum tantum aegrotavit. Conquestus est de dolore capitis, cum febre mediocri: Tertia die morbi, noctu ululabat instar canis, cum brachiorum varia agitatione; de die satis erat quietus, sed quid garriret nemo intelligebat, adeo ut assistentes obsessum a cacodaemone esse crederent, Latine et Graece eum loqui asserentes: quae causa fuit quod cultro anatomico expositus fuerit.

and pia mater were turgid with blood, while much was collected in the Torcular and Sinuses. In dividing the brain horizontally, after the manner of Sylvius, and especially in cutting the Corpus Callosum, there appeared an infinite number of bloody points, especially upon compressing the substance of the brain. The neck being divided, and the head cut off, for the purpose of examining the parts of the brain more curiously, much serum flowed from the occipital hole, which had, beyond a doubt, flowed from the ventricles, which were found empty *."

Under the title of "Poignant pain in the head, proceeding from a quantity of pellucid water in the ventricles of the Brain," the following simple but instructive case is narrated. "The little daughter of a certain countess, four years of age, of a delicate frame and bilious temperament, was seized with an ardent fever, without any remarkable disorder of the natural functions; the disorder increased; and on the fourteenth day the child expired. In the ventricles of the brain was found a pound of serum, more limpid than well-water; yet it caused no injury of the principal functions, except that often the child screamed out with lancing pain within the head †."

Thus have I proved, I doubt not to your entire contentment, how prone the brain of delicate children is to this inflammation of its surfaces, and that the serous effusion is rapid, profuse, and fatal. Such is the inflammation of the brain in its simplest state, as produced by accidental causes, let us see how far the disease strictly termed, WATER IN THE HEAD, produced by the same causes, and furthered by peculiar predisposition and temperament, born with the child, hereditary, common to all the brothers and sisters of a family, corresponds in its phenomena with this accidental disease.

OF HYDROCEPHALUS.—The child *born* Hydrocephalic has usually a manifest imperfection in the structure of the head, consisting of softer bones, relaxed sutures, enlarged fontanells, the head peculiarly big, and the face proportionably small: while children subject to the *acute* disease are small, delicate, and sprightly, none have large heads, and never have they the head enlarged by the disease. Hydrocephalus is most frequent about the age of four or five years; but the period during which children are subject

* Bonetus, ex propriis observationibus.

† In ventriculis cerebri posterioribus inventa fuit aquae libra, ipsae puteali magis perspicua, sine operationum principum laesione, nisi quod aliquando de *pungitivo* capitis dolore exclamaret.—*Miscellanea Curiosa, Anni* iv. *observ.* 38.

to hydrocephalus, extends from the second to the thirteenth year. A boy of five or six years of age, lively, ingenious, and active, is struck while running about, in full and vigorous health, among his playfellows, with sudden pain of the head and slight fever: the pain soon becomes intolerable; the boy throws himself upon his bed, or across the table, reclines his head upon a pillow or rests it upon his hands, and often requests his mother to hold it hard with both hands to assuage the pain: the pain, he says, sometimes, is in the forehead over the eyebrows, sometimes in the back head, often it seems seated under the parietal bone of one side: he tosses in that kind of agony and impatience which characterise toothache or any other extreme and acute pain; the cheeks are flushed, the eye watery and hurt by light, the belly costive, the pulse quick and fretful; and often even the very commencement of the pain is attended with sickness and puking.

Thus is the first or inflammatory stage of the disease begun: The child has disturbed and troubled sleep, grinds the teeth continually, and picks the nose; screams out during the night with pain and terror, and often is delirious, and wakens from sleep as children are in all their little ailments apt to do confused and terrified: The pain rages; the child's cries become more acute and piercing; the sickness and puking, especially in the morning and evening, are by the third day more frequent, and by the sixth or eighth the disease is at its achme: the signs of fever and the rapidity of the pulse are greater, and the flushing of the cheek deeper: the sensibility of the eye is greatly increased, the rays of a candle or any sudden gleam of light causes excruciating pain, and the child screams with the torture.

This is the acute state of the disease, which changes its form usually about the fourteenth day: Then the palsy, squinting, and stupor, begin to take place of the delirium and pain: the pulse, hitherto rapid, becomes slow; and the boy, hitherto wakeful, slumbers, and soon falls into a state of coma, often raising his hands to his head in sign of suffering: the vomiting is at first more frequent; the boy lies in a sort of stupor, interrupted only by unnatural and dismal cries, less rational, wilder, and more piercing than at first: he sees double, the pupil begins to dilate, and the eye becomes every moment less sensible to light: there is a constipation from paralysis of the bowels, so that they are never moved but by the use of purges, and a total blindness from paralysis of the optic nerve: the eyes are so turned up that the white alone is seen, and the limbs are agitated by slight convulsions; but

sometimes the eyes squint horribly, while the head and hand are continually turned in convulsive and uncouth motions. Before the boy expires, the convulsions usually cease; he swallows with difficulty, and passes his urine and faeces involuntarily: there is an interval of stillness and insensibility, uninterrupted, except by occasional shrieks: the torpor increases, the limbs are relaxed and palsied, the pupil is still farther dilated, the pulse beats from 120 to 130 in the minute, and becomes at last too rapid to be counted; the face is very pale, the nose peaked, the features shrunk, and the eye quite insensible to light, and the body to pain. This palsied state begins on the eighth or tenth, and the boy seldom survives the twentieth or twenty-fifth day.

Upon dissecting the head, we find the chief exudation upon the internal surfaces: we find the cavities of the brain dilated, its substance proportionally extenuated, three, four, or five ounces of limpid water are found in each ventricle; and this is very remarkable, that if the child die only on the fourth or fifth day during the period of inflammation, the vessels are universally turgid and the effusion small; if his death be protracted to the fifteenth or twentieth day, the period of serous effusion, the veins are little turgid, the red and bloody points havein a great measure disappeared, the plexus choroides are bleached like, and the serous exudation is great.

Such is the state of the organ: Can this be accounted any thing but inflammation of the brain, the headache of children ending in effusion? Or does it differ in any one essential symptom from the headache of the adult? It is a state requiring bleeding, leeches, purges, the warm-bath, and, in its advanced stage, blisters: in its latter period, after the symptoms of torpor are begun, the patient's state is decisive and unalterable. Nothing can be to me a surer proof that Quin had indeed (as has been alledged) written before he had practised, and described a disease the nature of which he did not know, than the following imprudent declaration: "Tutissimum erit EMETICUM propinare, nec non catharticum utpote quae felici eventu exhiberi possitet, si vel vermibus intestina, vel sordibus ventriculus gravantur." I have no doubt this *diagnostic emetic*, this experiment, for discovering whether the disease be from a foul stomach or worms on the one hand, or inflammation of the brain on the other, will have the best effects, if the disease be slight, i. e. if the disorder be in the stomach or bowels: but, if it be in the brain, and the patient be in real danger, it is just pushing him off the brink! launching him into the stream, to swim for life.

Such is inflammation of the brain in a child, where serous effusion invariably accompanies the inflammation, and torpor and convulsion succeeds to delirious pain: By what gradations this state of exudation is connected with the suppurating state of the brain, how entirely the condition of the inflamed ventricle resembles the condition of inflamed cavities in other parts of the body, must next be explained. When the cavities of the peritoneum, the pleura, or pericardium, are inflamed, the general surface pours out a serous exudation; the parts more highly inflamed are covered with a thick and viscid crust of mucous and purulence, while particular points are in a state of ulceration. Such is the mixed form of the disease in fatal inflammations of the greater cavities, such is also, sometimes, the ulcerated state of the cavities of the brain. " A young man, (says Wepfer*), of nineteen years of age, was seized in the beginning of November with headache, and vomited his meals. He consulted the hangman, who prescribed a purging powder, and ordered him to be bled. What other medicines he may have had, we knew not, but, his disorder increasing daily, he was on the 11th of the month brought to the hospital: his fever was but slight, his urine natural; he lay in a deep sleep; when roused, he raved and was delirious: he never asked for food or drink: what was offered, he took: whatever was put into his mouth, he swallowed down: he was fed like an infant. On the 15th, (says Wepfer), I visited him in company with Harderius, and found him in so deep a stupor, that he could in no way be roused: his friends said he slept by day, and waked by night: he passed his urine insensibly, and on the 17th expired.

" Upon opening the head, we found the veins on the surface of the pia mater, where they meet in the third sinus or Tortucular Hierophyli, oppressed with blood, and dilated to thrice their natural size, so that all the upper parts of the

* " Bartholomaeus Feer Triboldinga Turgovius Adolescens novendecim annorum, sartor circa principium Novembr. 1656. capite doluit: assumpta evomuit: hujus causa carnificem consuluit, qui purgans propinavit et venaé-sectionem suasit: an praeterea aliis medicamentis et qua diaeta usus fuerit rescire non potui. In dies morbo in deterius vergente 11. Novemb. ad Nosodochium delatus, fuit; febricitare mediocriter videbatur: dormivit plurimum, expergefactus stupidus quasi erat, et delira loquebatur: nec cibum nec potum petiit: oblatum et intrusum deglutiit: cibandus erat instar infantis. Urina naturali simillima; die 15. Novem. quo ipsum cum Exc. D. D. Christophoro Hardero conveneram, profundissimè dormivit, ut ipsum nulla ratione excitare potuerimus; ajebant adstantes ipsum interdiu dormire, noctu vigilare: attamen inscius lectum perminxerat: In respiratione nullum adhuc dum vitium observatum fuit, die 17. Novem. hora 10. noctis mortuus est.

brain seemed suffused with extravasated blood; yet, upon opening the dura mater, there was no extravasation: the third sinus was remarkably full of blood. Upon cutting down to the level of the left ventricle, there straightway flowed from it a profusion of serum; and upon lifting the fornix, and displaying at once both the lateral ventricles, their surfaces were seen imbued with a viscid purulent humour of the consistence of a thin poultice: the third ventricle was likewise coated with it. The surface, moreover, of each ventricle seemed rough, irregular, and flaccid, and plainly ulcerated; for while I wiped away the pus, (says Wepfer), though with the utmost delicacy and gentleness, I tore up the medullary substance of the brain itself, much altered from its natural whiteness and splendour, and appearing of a yellow or brownish tinge."

Far from delighting in extraordinary and wonderful narratives, I put a value only on such as correspond with the daily occurrences of practice. The case just detailed is of this description, and especially worthy of your attention. A disorder of the head, in a young and healthy lad, is marked by violent headache: the delirium which ensues is not that of fever, for there is little fever, but of violent pain, the inseparable concomitant of inflammation; and all the other characteristic signs of inflammation of the brain are detailed in this narrative with the utmost simplicity. From simple headache, with which the inflammation begins, it passes in rapid succession through all its stages: first, there is, during many days, intense headache; secondly, that state of inflammation is followed by a slight and symptomatic fever; thirdly, the headache and fever are followed by delirium; fourthly, the delirium begins to change to insensibility and stupor, the patient lies lethargic when undisturbed, but when roused, is bewildered, delirious, and raves, which constitutes the true Typhomania or alternation of delirium and stupor; and, finally, the organization of the brain is quite disordered; the occasional delirium ends in permanent stupor, from which the patient can in no way be roused, ending in involuntary discharges of the urine and faeces, and in death. This catastrophe happens within the 12th or 14th day, the prescribed period in which those labouring under any acute disorders of the brain recover or perish: the disease endures for a term intermediate betwixt Phrenitis the most rapid, and Hydrocephalus the slowest, inflammation; and the brain is at once loaded with blood in its veinous system, inundated with water in all its interstices and cavities, ulcerated in its ventricles, their surfaces being coated with pus: the patient dies phrenitic, because phrenzy, surpassing the common degree of delirium, and much

disproportioned to the degree of fever, is the peculiar characteristic of inflamed brain.

Thus have we a second form of inflammation more violent than Hydrocephalus, differing only in degree. But before I forsake the evidences of a pathological fact on which so many other important matters depend, I would prove one circumstance more, viz. that the serous effusion happens when the inflammation runs high so early as the fourth, and is fatal on the fifth, day of the disease. The cause from which such inflammation arises, whether it be from the heats of summer, from fatigue, from quarrelling and passionate altercations, from drunkenness or from blows, or from all these combined, as in the following case, produces no perceptible variety in the symptoms, or form of the disease, only the inflammation is more intense and rapid, the delirium more violent, the oppression deeper; the palsy which precedes death is accompanied with convulsive motions, and those, who are thus suddenly cut off in the prime of life, have the last delirious struggles, the approaching stupor, and the incontinence of urine and faeces, accompanied with profuse perspirations. The brain is found after death oppressed with veinous blood, and inundated with serum; but there is no other mark of disorder than that slight serous effusion which invariably accompanies inflammation in all parts of the body.* "Phillip Gardt, a baker, a well sized and muscular man, but pale andtremulous from frequent intoxication, got into a quarrel; and while he was stooping on account of the blood which streamed from his nose, his antagonist hit him with the fist in the left eye, but he was so little injured, to all appearance, as to go first to the Mayor of the city to make

* Philippus Gardt. Pistor Neukircha Cleggoius: Annor. 44. staturae justae, carnosus, pallidus, poculis deditus, quandoque etiam spiritui vini indulgens: tremulus, quamobrem aliaque symptomata vere usus est medicamentis ex Nasturtio acquatico paratis. Anno 1684. die 3. Jul. hora 1. pomeridiana, dum propter narium Haemorrhagiam Caput pronum tenuerat ab adversario pugno in oculum sinistrum percussus fuit. Adiit mox oppidi Praefectum, ac percussorem, non sine stomacho, graviter accusavit, hinc Chirurgum in suis aedibus convenit, imposuit pulvillum ex stuppa confectum et albumine ovi alumine agitato, additus aq. rosar. et pauxillo croci imbutum. D. 4. Jul. querebatur de oculi punctione et ardore; nihilominus ut hesterna vespera vinum bibit; continuabatur Epithema; obambulavit, quandoque per horulam decubuit. D. 5. Jul. Quoniam ardor et dolor continuarunt, sacculus herbis cephal. et discutientib. infarctus ac in vino albo coctus impositus fuit. Vini potum nondum intermisit. D. 6. Jul. Nunc sana mente loquebatur; subinde deliravit: in manu sinistra inter pollicem et indicem vena, quam balneatores Cephalicam vocant, pertusa fuit: Vesperi Epilepsia corripiebatur, atque iterum noctu D. 8. Jul. De Cephalagia valde querebatur. Mane ipsum convenit Dominus Sybandt Chirurgus nostras: deliravit cum furore quodam, floccos legit, lintea attraxit, de decimis, quae causa litis erant, confusa loquebatur, aestuavit, largissime sudavit; artus, oculi, maxillae

his complaint, which he did in very rude and violent terms, and then to the house of the surgeon, who applied a mass of alumn curd. Next day, he complained of pungent and burning pain of the eye, but in the evening he got drunk again: he walked about, and continued to apply his poultice of alumn-curd. On the third day, a bag of discutient herbs, steeped in white-wine, was applied on account of the continued pain and heat: On the fourth, he continued drinking, spoke sometimes rationally, sometimes wildly: he was bled this day from the cephalic vein, as it is termed, of the thumb: in the evening of this the fourth day, he was seized with epilepsy, and again during the night, complaining continually of deep seated headache: In the morning of the fifth day, Sybant, the surgeon, visited him along with me: we found him furiously delirious seeming to gather mots and hairs, pulling up the bed-clothes, speaking confussedly and incessantly about the tythes, the original cause of quarrel: he was burning hot, and perspiring from every pore; the limbs, the eye, the lower jaw, were strongly convulsed; the tongue was bitten deeply; he asked for nothing, but there was nothing you could present to him he would not drink, even the diaphoretic draughts he swallowed greedily, nor could the attendants refuse him wine in this distressing situation: all night long he raved and struggled, but always when the injured part was touched, he withdrew his head, and that even when he was expiring. On the morning of the sixth day his neck was stiffened, his eye fixed and motionless, he knew no one, nor did he wink or shut the eye-lids when the hand was passed across them; when pinched and tormented, he seemed insensible, yet he moved his limbs a little, sometimes muttered, and sometimes cursed: when they hollowed into his ear, he seemed unconscious; and a little before he expired, he spit out, though feebly and difficultly: at two in the afternoon he expired without a struggle."

"Upon cutting the integuments, their cellular substance seemed watery and gelatinous: the hurt eye was greenish and livid without, but there was no mark of

convellebantur, linguam morsu valde vulneravit. Abradebantur capilli, brachiis imponebantur Vesicatoria: nihil postulavit, oblatum tamen potum deglutiit, etiam Aquam diaphoreticam: nec in hoc rerum statu adstantes ipsi vinum denegarunt: multum sanguinis exspuit. Tota nocte deliravit: si circa locum affectum attingebatur, caput amovit idque etiam adhuc paulo ante mortem. D. 8. Jul. mane collum abriguit, obtutus fixus, neminem agnovit, digitis ad oculos admotis, non nictitavit, nec vel minimum percellebatur: Vellicatus nullum sensus indicium praebuit, artus subinde movit, loquebatur incongrua, subinde juravit; inclamatus nullum auditûs signum praebuit. Paulo ante obitum, sed imbecillus, exspuit. Hora 2. pomeridiana mortuus est placide.—*Wepfer, Observatio iii.*

injury within, the ball of the eye being sound, the socket without extravasation: within the scull there was no extravasation, nor under the dura mater, nor among the convolutions of the brain, nor one drop of extravasated blood on the basis of the brain; but all the veins and arteries and sinuses, and especially the artery which mounts over the corpus callosum, and the veins of the plexus choroides, were turgid with blood; and betwixt the pia mater and the convolutions of the brain, there was much extravasated serum, some fluid, but chiefly gelatinous."

Wepfer judiciously imputes the condition in which this man died, less to the blow than to his habitual vice of drinking, to that effervescence of the blood manifested by the haemorrhagy from the nose, (which came on at mid-day, in consequence of heat and drunkenness,) to those noisy quarrels, struggles, and altercations, which preceded and followed the blow; to the passionate complaints he made before the magistrate, and to the continued intoxication of the succeeding days; but Wepfer concludes with a remark altogether surprising: "The symptoms preceding death were furious delirium and convulsions; but there were found, on opening the cranium, no marks of inflammation, no appearance of extravasation, (Ejus signa, dum vixit, non obsura erant delirium cum ferocia et convulsiones, quamvis nihil inflammati, nihil extravasati intra cranium repertum fuerit). What are signs of inflammation, if furious delirium be not? What are the marks of it in the brain after death, but distended vessels and serous effusion? What are the signs of inflammation in any of the cavities or organs of the body, but disordered function, pungent pain, and extravasation or serous effusion into the cellular substance of the part?

But I proceed to remark a thing of greater moment, and it is this: You will invariably observe, that wherever congestion arising from high action in the vessels of the brain is taking place in the veins; wherever inflammation terminates in that state which resembles gangrene of the external parts; wherever the veins are dilated and the substance of the brain blackened, where in short the Sphalismus Cerebri or gangrene of the brain, mentioned by Hippocrates, has come on, the patient falls into a deep immoveable stupor: When, on the contrary, this stage is anticipated by a serous exudation, where a disease resembling the hydrocephalus of boys takes place in the adult, the patient retains, to the last moment of his existence, a degree of sense and intellect, and often I fear continues sensible to the last offices of friends, and to their lamentations and discourses, long after he has ceased to give tokens of consciousness; so it surely was with this man, who was able to relieve himself of the saliva by spitting, though feebly.

I know that in many of those narratives, and in some of my observations, you will find recorded, pictures of disease which will be useful in your future practice, which will present themselves to your imagination whenever the scene is renewed, and will assist you to judge truly of the danger of your patient, and of the condition of the brain. Pain and delirium, even convulsion itself, is different in the child and in the adult; that condition of the brain which is in the child, denoted by wild unnatural screams, is accompanied in the adult with loss of reason, delirium, and fury; but so gradually does the serous effusion take place, so slowly are the faculties obscured, that the phenomena are altogether peculiar, and such as cannot be misinterpreted.

When, in either sex, headaches have been a habitual ailment, and have, by confinement and suffering, brought the system to a delicate, feeble, and irritable state, be assured that life is held on a precarious tenure: do not then unfeelingly ascribe to capriciousness of temper disorders which arise from physical disease; do not, by indifference to slighter ailments, make yourself responsible for the afflicting scenes which may ensue, nor imitate those who give emetics, (the most violent and often the most dangerous of all remedies,) with the same indifference as a placebo is usually given. When habitual headaches arise to any unusual pitch, they are never void of danger: when they have but short imperfect remissions and terrible exacerbations; when the pain of the temples makes the face pale and haggard, the pulses small, and the extremities cold; when each returning menstruation in women, or every attempt at business or exercise in men, occasions a new and terrible paroxysm; when, after days or weeks of suffering, accompanied with perturbed sleep and fearful dreams, the patient begins to be slightly delirious during the night, and giddy and sick during the day, effusion of serum is threatened! when the delirium begins to be mixed with stupor, it is actually begun! the ventricles are already enlarged, the structure of the brain irremediably injured! and the last scene, which lasts for weeks, is very agitating. The headaches do not cease: slight screams, a sort of stupor and fainting attend each paroxysm of headache: a flushed cheek, and accelerated but feeble pulse, warn you of the returning pain, and frequent sickness follows each return, till at last the patient lies insensible, unless when forced to reply, or when called to take food or drink: This horrid sign distinguishes this peculiar kind of stupor, that in the adult, as in the hydrocephalic child, a voracious craving makes every thing acceptable; whatever is offered is swallowed. When the effusion has begun to oppress the functions of the brain, the sickness of the early stage ceases: you begin to observe irregularity and indecision in the pointing of the eyes, and confusion and

trembling in the motion of the hands: the patient is no longer offended with light: the vision is plainly indistinct: he hears imperfectly, and answers slowly and with frequent sighing: the tongue faulters, and you can perceive that the ideas are more correct than the expression, the patient often using misplaced words, which he seems conscious are misplaced: the faeces and urine begin to escape insensibly; he lies with his head low, his eyes closed, his breathing is slow, oppressed, and accompanied with sighing: he is perpetually fumbling with the clothes, or picking them, as if gathering mots with the finger and thumb; and as the insensibility increases, one hand, though not palsied, generally lies still and dead, while the opposite hand is in perpetual motion, grasping irregularly, and trembling; this perpetual groping and trembling of the hands is the most fatal sign of all. At last the stupor is complete: there is "no more moving:" the urine and faeces no longer pass unconsciously: the bladder and the rectum are now paralysed as well as their sphincters, the bladder rises sensibly distended above the pubis, while the stomach and bowels are swelled with flatus, and this takes place usually twenty-four hours before death. The putting out of the hands, the fumbling, groping, and trembling, is a fatal irreversible sign; when this appears, though but in a slight degree, the patient is surely to die. The brain is found, upon dissection, to have its veins conspicuously dilated with black blood, and appearing in great number, while a profusion of serum distends the ventricles, and inundates all the surfaces of the brain.

Thus, you perceive, the inflammation which ends in serous effusion, is the same in the adult and in the child; and you may easily anticipate another truth, if what I have already said be true, viz. That nothing farther is required than a higher degree of arterial action, a more intense and rapid inflammation, to alter at once the form and name of the disease, for the patient, whether adult or child, who is cut off on the fourth or fifth day before the effusion or palsy take place, dies in the phrenitic stage, raving and struggling, sometimes with actual sphacelus of the brain. The inflammation, which protracted to the fourteenth day, is stopped by serous effusion, and ends in hydrocephalic palsy, and convulsion terminates, if but a little more violent, on the fourth or fifth day, (after phrenitic delirium,) in complete stupor, from blood so impacted into the vessels of the brain as to be equivalent to gangrene of a less important part, Hydrocephalus and Phrenzy are indeed two shades of one disease: hydrocephalus or serous effusion stills the arterial action by which it was produced by at once emptying the vessels, compressing them (by filling the cellular interstices,) and deadening the energy of the brain; but the phrenitic state, a state of

much higher excitement, by gorging the vessels beyond their power of action, ruins the organization, and causes a more sudden death, as the case I shall now relate to you will prove: the ventricles are, in the case of Sphacelus Cerebri, filled in some degree with water, because serous effusion is inseparable from all states and stages of inflammation, but Gangrene, inequivocal Sphacelus of the brain, is the disease of which the patient actually dies. "The subject of this following case was a delicate girl of six years of age, of an unhealthy constitution, a pale and sallow complexion, an insatiable appetite, a speedy digestion, and exhaling an acid odour in perspiring and from the faeces; a child, in short, of a lax unhealthy habit, subject to acidities in the primae viae. She had the confluent small-pox, succeeded by a lingering second-fever, which required tonics and the bark. After the fever left her, there came out small boils on various parts of the body, of which some suppurated, others disappeared."

"Recovered from these reliquiae morbi, she was carried to the country, where, by the help of tonics and antisceptics, she regained her health. Through all the succeeding winter, which was severe, she was afflicted with colds, rheumatism, and cough; and she exposed herself, on the approach of Spring, by going out from much heated chambers into the open air, irregularly at all hours, and when the bleak cold winds of Spring began to blow."

"It was on the 15th of May, towards evening, that she first complained of a very acute pain of the head, extending from the vertex to both ears, but especially to the right, which also appeared somewhat swelled: Then ensued bilious vomiting, and a very restless night.

"Next day the pain continued, the urine was pale, crude, sparing in quantity, and unconcocted; the pulse quick, hard, intermitting; she spoke little, and was delirious: she was slightly recovered by a lenient purge: she had a sort of shivering at mid-day, followed by universal pains: the fever rose, became intense, her senses were quite oppressed, she rejected whatever was offered to her except lemonade, which she swallowed greedily: being bled from the arm in the evening, the blood was found to have the buffycoat; blisters were next applied behind the ears, but they procured not the slightest relief; as the night advanced, the face swelled, but without redness, the eyes werefixed and prominent, the breathing interrupted with sighing, she groaned much, and lay stupid and oppressed."

"On the third day leeches were put to the temples, a blister was applied to the head, and rubefacient plasters to the legs and soles of the feet. Towards mid-day

the feet grew cold, but in the evening they seemed to partake of the heat of the fever which was then intense over all the body. When spoke to, she moaned, but could not answer: she tossed from side to side in bed; her limbs were agitated and in continual motion; she struggled sometimes with her legs, sometimes with her arms; at times she started out of bed, and tore her hair and face with her nails; towards evening the leeches were applied again, not to her temples, but to her nostrils."

"On the fourth day the glisters given generally for nourishment were suddenly rejected: at mid-day, while the head was burning hot, the extremities were cold; the pulse became quick, weak, irregular, and intermitting; the breathing was oppressed and stertorous, and she fell into total insensibility and coma: as the night advanced, the fever kindled again; the feet were bathed in hot water, and cold solutions were laid upon the forehead."

"On the fifth day the symptoms, still the same, were so much increased, that the child was plainly dying: about mid-day, she had a natural stool, and seemed relieved, restored as it were from the very jaws of death: but she was seized during the night with convulsion; the body was bent backwards, every thing looked desperate, and next day, her strength gradually declining, she expired."

The dissection was at the instance of Bursarius, and under his inspection performed by one who seems to have been a favourite pupil, Caietanus Vindemarius, now physician in ordinary to the Infirmary of Vienna. How many physicians in ordinary to Infirmaries could I name, who know not the Pineal from the Pituitary gland. The evidence in this case is unexceptionable to the important fact of the brain being truly in a state of gangrene. "* This little girl (says Bursarius) of six years of age, died on the fifth day, of gangrene of the brain. Upon dissecting the body, the dura mater was found to adhere so to the cranium, that it was with much difficulty pulled away. The blood vessels of this membrane were extremely dilated, and very turgid with blood, while the pia mater, much harder than natural, actually cut with difficulty, and those membranes being raised up, the cortical substance of the brain on its upper part was manifestly gangrenous and corrupted, of a leaden

* Bursarius says of this girl in another passage, Puellae sexennis, quae ex *sphacelisnns cerebri* intra quinque dies obiit, Cadaver sectum est. Dura mater cranio ita adherebat, ut difficillime divelleretur. Ejus vasa ablato cranio, sanguine plurimum distenta et praeter modum turgida aparuere. Pia mater aliquanto durior solito inventa est, sic ut aegre discindi posset. Remotis meningibus, superior loborum cerebri corticalis pars *plane corrupta et putrida, coloris plumbei* reperta est sine ulla puris effusione. Medullaris substantia quoad discerni potuit intacta erat."—*Bursarius*, §. 172.

colour, without any appearance of pus, while the medullary substance of the brain was, as far as could be perceived, entirely sound. " In the ventricles, nothing was found particular except a slight effusion of serum, occupying those of the cerebellum."

Now, a new and interesting scene opens to you: you are conscious that the symptoms of inflammation of the brain vary, while the action is the same; that it is different in the sanguine and in the sallow, in the child and in the adult; that inflammation of the brain according to its various aspects, or stages, or terminations, forms many diseases; that it is HYDROCEPHALUS when terminating, as it usually does in boys, slowly in watery effusion: it is SPHACELUS when terminating, as sometimes it does in young men, after long travelling in the sun, or deep debauches, and especially in warm climates and in plethoric and vigorous habits, in gangrene of the brain, a sudden and terrible death. It is VOMICA or abscess, when terminating (as often it does after local injury proceeding from slight extravasations of blood or serum,) in partial suppurations of the brain *.

OF PHRENITIS, SIDERATIO, OR SPHACELUS CEREBRI.—Names conduce infinitely to explain or to confound; and those, I am sensible, which have been appropriated to this disease, are better calculated for the latter purpose than the former, for they express sometimes the cause of the disease, sometimes the symptoms, sometimes the state of the brain, sometimes the particular stage of inflammation. It is this variety of names that gives the semblance of many diseases to an affection which is one and uniform in its nature. We cannot wonder that physicians practising

* In place of ascribing such phrenitic delirium to the inflammation of the brain, the ancients universally ascribed this and all other disorders of the head to black or yellow bile coursing through the body, and especially disordering the brain; and to prevent its generation, particular diets were recommended, and particular kinds of food prescribed. Galen formally and decisively forbids the flesh of dogs, goats, bulls, camels, dromedaries, boars, asses, and wolves, which mankind have long ago ceased to prey upon, and he has forbidden other magnificent dishes, as of sea-calves, and dolphins, and all kinds of whales! These are not fashionable, even at the tables which could afford them, our hospitable nobility of England never going higher than a roasted ox.

Porrô qui sanguinem melancholicum gignunt, hi ferè sunt, caprina bubulàque caro, magisque hircinae et taurinae, sed maximè asinorum et camelorum carnes: itemque vulpinae et caninae. Magnum ad hujusmodi sanguinis generationem momentum adfert etiam leporis esus, sed multo magis aprorum. Limaces quoque sanguinem melancholicum pariunt, si frequens sit eorum usus. Praeterea omnium animalium terrestrium carnes sale conditae: necnon aquatilium carnes, ut Thunni, Balenae, Vituli Marini, Delphini, canis, atque cetaceorum omnium.

in various and distant climates or ages, Hippocrates in Greece, Rhazes in Arabia, Alpinus in Egypt, Bontius in the East Indies, Bonetus, and the authors he quotes, in Italy and Germany, should have used very dissimilar terms: It is pathology alone that can prove the unity of the disease, or reconcile the discordant names and descriptions of antient authors; but it will serve as a key to many difficulties in your future studies, if I make you understand the reasons of these names. The disease is named PHRENITIS from the state of the intellect, from the delirium, the raging delirium or phrenzy, accompanied with intolerable pain, in which the patient tears his hair and his flesh with his nails: It is named Sphacelus Cerebri, SPHACELESMUS, from the state of the organ, from the blackened and gangrenous condition in which some part of the brain is usually found, often livid, as in the case lately narrated, or of a greenish purple mixed with specks of suppuration. That this term Sphacelesmus Cerebri should be the term under which Hippocrates describes phrenzy, proves an acquaintance with pathology among the antients, a familiarity with dissection, and a long suit of observations; and it proves also that there had existed a strong persuasion, from the earliest times, that wherever the delirium runs rapidly into stupor, wherever the patient, having inflamed brain, dies on the third day, there must be gangrene: It is named SIDERATIO, SYRIASIS, in consideration of the cause, from the disease being peculiar to warm climates and sultry seasons, its arising from exposure to the intense heat of the sun, and raging under Syrius or the dog star, from the death of the patient being sudden, as if planet struck, and that sudden death being preceded by the most savage madness with howling, struggling, striking, and tearing his own flesh, and from the death of the patient being often accompanied by no visible marks of injury even in the cases of the most sudden and violent deaths, except over-distention of the vessels and general turgescence of the blood in the brain, or only dark coloured places or spots on its surface: the disease is, from the same observations, named Morbus Solstitialis, as epidemic in the most sultry season of the year.

But phrenzy is the inseparable sign, the mark of the disordered function: this must characterise inflammation of the brain, in the adult, in all its stages, and should be the generic name. Phrenitis is sometimes defined an inflammation of the brain, accompanied with unremitting delirium and acute fever, generally commencing in headache*,"

* Est genus phlegmasiae, acuta pyrexia et delirio perpetuo insignitum, a cephalalgia atroci utplurimum incipiens: definitur vulgo mentis alienatio continua cum febri acuta. I. R. Fortis.

an excellent and brief definition, since it connects the affection of the intellect with that of the organ, and implies that the fever is symptomatic, and the headache and disorder in the brain the cause of the disease. Yet such a definition is of no avail in practice: it serves but to distinguish the disease to those who know it, not to delineate the varying and terrible phenomena accompanying the first affection of the brain, or the trembling and stupor which succeed to these first symptoms in proportion as the vital powers decline.

The characters of this inflammation are strongly expressed, though its approach is after a manner which would give you no alarm: the patient is slightly disordered in his intellect, his face is pale, his eye wild, his countenance gloomy, his hands trembling, his lips and eye-lids quivering, his temper irritable, his motions expressive of trifling impatience rather than of violent passion: he is agitated and restless, puts off and on his cloaths without knowing what he is doing, rises and goes to bed frequently, and when prevailed with to lie, is restless, agitated, and falls into mean, senseless, and idiot-like babbling, which is the first stage of this terrible delirium.

In the second stage, there are marks of fever, at least a white tongue, a burning skin, and a little and quivering pulse: the pulse rises, the eyes are muddy, gory, and inflamed, the patient is more restless and agitated, tosses incessantly from side to side, and pulls up and kicks away the bed-cloaths, spits and grinds his teeth, and mutters, but without any wild cries: his voice, when he speaks, is sharp, piercing and impatient: he seems insensible or indifferent to whatever is said or done about him: his eyes are in perpetual motion, his head turning incessantly from side to side: he sputters the frothy saliva from his mouth, grasps at every object, and at the same time trembles with his hands, and continues muttering and slightly struggling, though he takes drink, or obeys your commands in lying still or preserving decent postures. But, after ten or twelve hours, or in the course of the second day, he starts out of bed, struggles with the attendants, with irresistible strength and fury, strikes, kicks, and bites equally the hands of his attendants or his own; twists and turns from their grasp, tears his hair and his face, speaks with inconceivable rapidity of utterance, and with a length of breath truly surprising; but it is not madness, for he has no jealousies, expresses no passions, strikes and kicks indifferently at every object animate and inanimate, bites indifferently at your hand or his own, drinks whatever unpleasant thing is presented, and often bites the cup; and his hurried talk is a string of unmeaning alliterations, pursued from sound to sound, without end or intermission, for the moment he draws breath, he begins again: he grins and shows his teeth, and sputters the saliva continually.

From the first moment of the phrenzy he never sleeps; there is no distinction of night and day, and a succession of attendants are exhausted; from time to time he bursts out of bed, and then subsides into a state of comparative silence and torpor, but unremittingly agitated, trembling, and bedewed with sweat.

When those intervals of torpor become more frequent and long, the third stage is begun: his shrieks, and shrill cries subside into muttering and grinning, his eyes moving still impatiently, his head in perpetual motion, his lips quivering, his hands trembling, he begins to fumble with the bed-clothes, and pick mots: the eye, before prominent and inflamed, deadens and subsides; the body breaks out into profuse sweats: the voice is tremulous, and sobbing like that of one immersed in cold water: the visage pale and grim, the hands cold and clammy, and the faeces and urine pass involuntarily; the profuse sweating bakes the hair, so that it stands up in points and forks, wild and disordered with struggling; and thus, after an interval of stupor or stillness, the patient expires generally on the third or fourth day.

This is the disorder of the intellect and of the nervous power, inseparable from inflammation of the brain, and forms too true a picture of the manner of the patient's death. Every symptom is to be taken in conjunction to form a right estimate of the disease. I have often observed, that wherever the raving stops short of the most furious struggles the patient is saved: yet, deep stupor, succeeding to maniacal struggles, is invariably a fatal sign: Though the picking of flakes from the bed-clothes, towards the close of a low and gentle typhus, (as the recovery of Galen himself proves)*, is not essentially a fatal symptom, yet, after a scene such as I have described, it portends death.

It is natural to resort now to the ancients, to see what descriptions they have left us of the more critical disorders of the brain; for sudden and fatal affections of the brain seem to have been peculiarly frequent among a people living, as the Greeks did, in a warmer climate, using the most violent exercises under the meridian sun, and usually plunging into the water when covered with sweat and dust. The writings of Hippocrates abound with repetitions, but they are the repi-

* In the warmer climate of Greece, this degree of insensibility and palsy, for such I judge it to be, in which the patient grops and picks the bed-clothes, was more certainly a fatal sign than with us; and their phrenitic or delirious fever was usually fatal by the fourth or fifth day: Yet Galen escaped after lying in this condition. "Alii rursus cogitatione falluntur minime, sensibus tamen hallucinantur: id quod mihi olim contigisse videtur, cum ardenti febre laborans et floccos vellerem, et in vestibus festuccas colligerem, idque animo constans."---*Galen, de Locis Eff. lib.* iv. "Galen tells

titions of a faithful and diligent observer, over anxious, perhaps, to mark the slightest varieties of disease : he is especially copious in delineating the diseases of the head : You must know the complexion of his life and writings, to value them up to their standard : he was not occupied in such a trade as medicine now is, but zealous and faithful in the discharge of its essential duties ; each individual case he recorded upon the spot ; at the end of every season he called himself to a strict account, by revising these several histories, and observing the general complexion which the epidemic diseases of the season had assumed : his clinical observations and histories, or his Books, as they are intituled, on Popular Diseases, in which he recites at once the course of the season, the state of the winds and the air, the prevailing epidemics, and the particular way in which his friends and patients were affected, the places of their abode, their condition of life, the immediate causes of their fevers or other diseases, and the manner of their recovery or death, form the most authentic and far the most valuable of his writings, and are an eternal reproach to the busy triflers of modern times. It is from Hippocrates that Sydenham, the first among the moderns, takes his notion of epidemic constitutions of the air. Hippocrates, as he was the most diligent observer of nature, produces the truest and most lively pictures ; and whatever repetitions may offend, whatever imperfections may appear in his writings, are to be accounted for by the peculiar circumstances or the peculiar frame of mind under which he composed his works. The science was as yet uninformed, there were no precedents in writing, no descriptions nor general views of disease, to regulate his method : and he hardened his stile by endeavouriug to concentrate each description into an aphoristic form, and to conjoin in one sentence a picture of the disease and a prognostic of the patient's fate.

Hippocrates studied carefully, and expressed minutely, first the general forms, and next the minuter features of each disease : Fever, headache, and phrenzy,

this passage of his life more circumstantially in another part of his works : Contrarium affectionem non solum in aliis, verum in me ipso, cum adolescens adhuc essem, expertus sum : cum enim per aestatem ardente febri laborarem, et festucas atro colore ex cubili eminere, et floccos similiter in vestibus esse putarem, quos auferre tentans, nihilq ; sub digitis eductum inveniens, accuratius, vehementiusq; id efficere conatus sum, audiens itaq ; duos ex amicis qui aderant, dicentes : Videsne hunc jam, et floccos evellere et festucas colligere, statim intellexi, quod dicebant me fecisse. Cum vero sic animo constarem, ut rationalis in me facultas non vacillaret : recte, inquam, dicitis : proinde ne phrenitis me arripiat, auxilio estote. Illi autem cum idoneis rigationibus caput foverunt, tota die, sequentiq; nocte gravibus insomniis turbatus sum, ut interim et clamare, et exilire viderer : verum postero die mitigata erant omnia accidentia.

seem to have been the epidemic diseases of his country; he delineates first, under the general head, ("MORBI A CAPITE FIENTES,") and in successive sketches, under distinct titles, ("Alius atque alius morbus,") all the varieties of these diseases, febrile, accidental, or epidemic. You will remark that, in the epidemics of Greece, every disease was accompanied with fever, and every febrile delirium was preceded by pain. "One form of disease (says Hippocrates) begins with rigors, pain of the head, and fever, the pain being seated chiefly about the ears and temples, extending towards the top of the head: the eyes are pained, the eye-lids heavy, the head loaded: the patient, upon being stirred, voids his urine, which flows easily: he lies in a state of stupor, the veins swelled, and the temples throbbing: he is restless, sighing, delirious with pain: sometimes he is relieved by a discharge of thin pus, but without this he dies on the seventh day. It is a disease which usually accompanies the relapse of a fever, especially when occasioned by the omission of purges, by remaining exposed to the sun, or by excess in wine.*"—"In another form of the the disease, when the veins have surcharged the brain with blood, so as to inflame that organ, a strong fever ensues, with pain of the sinciput and temples, extending backwards; tennitus aurium, dulness of hearing, anxieties, and perpetual and restless tossing, from excess of pain; and on the fifth or sixth day the patient expires †." We are struck with these repetitions of Hippocrates, for they prove at once that he referred the most frequent epidemics to the state of the brain, and felt the utmost anxiety to express the very minutest features of the universal disease of the country and climate in which he practised. "In another form (says Hippocrates) of the disease, the brain being corrupted, the pain extends along the spine from the nape of the neck, the coldness descends to the heart itself, the patient breaks out suddenly into sweat, while blood flows from the nose: many vomit, and

* Alius morbus, *rigor, dolor, et febris per caput:* maxime ad aurem, et ad tempora, et ad sinciput, et oculorum regiones dolet, et supercilia ipsi incumbere videntur, et gravitas caput detinet, et si quis ipsum moverit, minget, et multum, ac facile mingit, et dentes torpent, et stupor ipsos tenet, et *venae attolluntur, ac pulsant in capite, et non potest quietus esse,* sed anxius est, ac desipit prae dolore. Huic si quidem per nares, aut aures eruperit, aqua profluit subpurulenta, et sanus evadit. Sin minus, plerumque in septem diebus moritur. Hic morbus maxime fit ex febre lypiria, quum liberatus a febre, nondum purgatus, aut cibis se impleverit, aut inebriatus fuerit, aut in sole laborarit.

† Alius morbus. Si venae circa cerebrum sanguinem superevomuerint, ac cerebrum calefecerint, febris emergit fortis, et *dolor ad tempora,* et sinciput, ac posteriorem capitis partem; et aures tinniunt, *ac flatu implentur, et nihil audit, et anxius est, et se ipsum prae dolore jactat.* Hic quinta, aut sexta, die moritur.

those who are thus affected expire on the third day. *" The shivering, inquietude, restlessness, and fever, the commencement of the disorder in pain, its progress to delirium, and its fatal termination by the seventh day, characterise a disease not purely phrenitic, not merely febrile, but accompanied, (as in all the febrile diseases of that climate,) with a decided inflammation of the brain.

Hippocrates proceeding from febrile to local and particular diseases, (De febribus universis a me dictum est, de reliquis jam dicam,) proceeds to give a description of Phrenitis, or fatal delirium from inflamed brain, as full and perfect as has ever since been sketched: " When the brain is tumid from inflammation, the whole head is pained, principally where the inflammation is, but chiefly concentrating about the temples: there is tennitus aurium; the hearing is obscured; the veins swell and pulsate; there is always fever, sometimes rigors, and headache is never entirely absent, though sometimes it remits and sometimes is more oppressive: the patient howls and rages with pain, bursts out of bed, then quickly throws himself down again on his bed, and tosses with agony. This is a deadly disease; but on what day the patient may expire it were hard to tell, since some die early, others later, but usually before the seventh day; when they pass the twentieth day they escape.†"

* Alius morbus. Si cerebrum corruptum fuerit, dolor ex cervicis, nervo ad spinam tendit, et ad cor frigus descendit, et derepente novus sudor adest, et per nares sanguis fluit. Vomunt quoque multi. Hic triduo moritur.

The Greek and Arabian physicians were in the practice, in diseases of the brain, of establishing an issue in the forehead, by running a spatula or flat knife betwixt the scalp and the scull, and sealing it up with a pitch plaster for seven days, unless the pain of the head continued. This savage operation shows how desparate they thought the disease. The best descriptions are in Albacasis the Arabian. The following is from Hippocrates: " Quum igitur sic habuerit, deraso capite, si non calefactoriis cesserit, frontem ea parte, qua capillus desinit, a capite findito; ubi vero secueris, disparata, ac diducta cute, quum sanguis defluxerit, salem tenuissimum inspergito, et postquam effluxerit sanguis, fissuram camponito, et duplici filo totam ipsam includito. Deinde splenium cera, ac pice illitum, ulceri imponito, et lana sordida superimposita deligato, et ad dies septem ne solvito, si non dolor vexet: si vero dolor adsit, exolvito.

† Quum cerebrum ab inflammatione tumuerit, dolor totum caput occupat, maxime qua parte constiterit inflammatio. Consistit autem in temporibus; et aures sonitu implentur, et auditus hebescit, et venae extentae sunt, ac pulsant, et febris, ac rigor aliquando corripiunt, et dolor nunquam *deficit*, sed quandoque remittit, quandoque magis premit, et vociferatur, *ac exilit prae dolore. Et ubi surrexit, rursus ad lectum decumbere festinat, et jactat se ipsum.* Hic lethaliter quidem affectus est, in quot vero

Such is the disease which he describes under the title of HUMOR CEREBRI: But the condition of those who are struck the most suddenly, and die the most immediately, remains to be told; it also is distinguished from apoplexy, or any state but that of inflammation, by the intense pain. The SYDERATI is the title of the description, which runs thus: "Those star-struck, as is usually imagined, in whom the head is loaded with foul and corrupted humours, never reach the seventh, but perish on the third or fifth day: the pain is felt first in the fore part of the head: they become blind, sometimes of both eyes, sometimes of one: they are stupid and delirious, with throbbing temples, a slight fever, and the body powerless; if they survive to the seventh day, they live. *" One description more I cannot refrain from laying before you; it is that of a kind of stupor so sudden, so deep, so apoplectic, (yet characterised by preceding pain,) that it expressly resembles the Coup de Soleil of our colonial territories: "One in health is suddenly struck with pain in the head; becomes speechless; snores with open mouth; when spoken to or stirred, he only sighs; he is altogether senseless, and passes much urine, which flows unconsciously: if not seized with fever, he surely dies upon the seventh day. †" So deep a stupor, so violent a headache, so total an absence of fever, ascertains the nature of the disease, and the prognostic is the most singular proof of its nature, for wherever the disease lies merely in the brain, the patient invariably dies; it is only when it is febrile that he survives.

I find no authority in the books of nosolgists, nor in the book of nature, to vindicate nice or curious distinctions; but there are certain broad and discernible marks of character, which though time and experience might teach you, I think it right

diebus morietur, non habet judicationem. Nam alii aliter pereunt. Plerumque tamen in septem diebus moriuntur. Si vero vigesimum primum effugerint, sani fiunt.

* Qui icti, ac syderati esse dicuntur, quum cerebrum multa immunditia vitiosorum humorum repletum fuerit, anterior capitis pars *primum dolorem* ipsis exhibet, et suscipere non possunt, aliqui ambobus oculis, aliqui altero, et sopor ipsos tenet, et desipiunt, et tempora saliunt, et febris tenuis habet, et corporis impotentia. Hic tertia, aut quinta die moritur, et ad septem non devenit. Si vero devenerit, a morbo liber evadit.

† Alius morbus. Sanum derepente invadit dolor circa caput, et statim vox intercipitur, et stertit, et os hiat; et si quis ipsum vocet, aut moveat, solum suspirat, nihil autem intelligit, et multum mingit, *et mingere se non sentit. Hic si non febris ipsum corripiat, in septem diebus moritur.* Si vero corripiat, plerumque sanus fit.

to describe; for as the brain is primarily or secondarily affected, we have varieties of the disease differing essentially from each other, insomuch that I have no difficulty in affirming this as an universal prognostic, that, "Wherever in Fever there is much phrenzy, such fever partakes of the dangers essentially allied with every affection of the brain: that in Phrenzy, on the other hand, while there is much fever, there is less danger, since the phrenzy is not idiopathic, but partakes of the nature of fever: But where the phrenzy is, independent of every other affection, unaccompanied with fever, a pure idiopathic disease beginning in severe pain, it is almost invariably fatal." I am inclined to distinguish three species of the disease, the Febrile Phrenitis, the Cephalagic Phrenitis, and the Maniacal Phrenitis. My reasons for proposing these distinctions must appear in the description.

Of Febrile Phrenitis or Fever of the Brain, in which fever is more conspicuous.—This is one of the diseases from which youth, health, and strength, are far from being a protection: it appears in the vigorous and athletic: it arises from passion and agitation of mind, from quarrels, drinking, and debauchery; from hard labour or furious riding in the heat of the sun; from long and rapid journies in the heighth of summer, or in the sultry days of autumn; from hunting and walking expeditions usually undertaken in the season of the year most unfit for such amusements; most frequently of all from athletic young men trying their strength, walking for a wager seventy or eighty miles, and too often concluding the feat with a debauch of wine.

When the brain begins to be inflamed, the head is hot, the eyes red, the face pale; there is a feeling of langour of body and imbecility of mind quite unusual even in fever; and the affection of the brain is conspicuous even in the first hours of the disease, in the giddiness, tremors, fainting, imbecile and babbling talk, and a species of fatuity or idiotism, the *desipientia levis*) with which the disease begins.

As yet there are no signs of fever except a bitter and parched mouth, a fluttering pulse, and a dry skin; but, from the moment of being seized, the patient is sleepless, tossing, passionate, impatient, and slightly delirious; on the second day, he struggles to get out of bed; the delirium rises every moment; and after striking and struggling with demoniacal strength and fury, with an inflamed visage, his hair standing on end with the struggles and the moisture, sweating at every pore, and very generally having profuse haemorrhages from the nose, and fauces, he falls down at last into a temporary stupor, and lies bathed in clamy sweats: sometimes he recovers a degree of reason; usually the interval is past in still-stupor with slight muttering;

for two days more, this torpor is occasionally interrupted by paroxysms of the most furious phrenzy, constituting the true Typhomania, viz. alternate phrenzy and stupor: He at last sinks altogether: the haemorrhages cease, or cease at least to be active, in place of a profusion of florid blood, black ichor issues from the throat and nostrils: the stupor increases; he mutters continually, and picks the bed-cloaths; begins to pass his urine and faeces unconsciously, a subsultus tendinum or slight and tremulous convulsion affects the whole body, and he expires on the fifth or sixth day. Thus, the brain fever of this climate, though it is truly a febrile inflammation of the brain, degenerates very early into stupor, coma, and subsultus; and thence it is, that the terms brain-fever and low-fever are now generally received as synonymous. The stupor and palsy of the sphincters, with the subsultus tendinum, are mentioned as the signs of the lowest state of debility, and the haemorrhages as a sign of the dissolved state of the blood.

I have already told you that this febrile inflammation of the brain was the great epidemic in Greece; and I take a pleasure in at once exemplifying the disease, and making you acquainted with the manner and stile of Hippocrates, by transcribing one of his cases:

"Erasinus, living by the Torrent of the Bootes, was, after supper, seized with high fever, was perturbed during the night, passed the following day more quietly, but the succeeding night he was in great disorder: on the second day, he was in all respects worse, and towards night became delirious: the third was a distressing day, with much delirium: the fourth was a very restless day, and the night was passed, without sleep, in terror, delirium, and agitating dreams: on the fifth morning, he recovered his senses; but by mid-day, he became once more delirious and furious, his extremities became cold and livid, and by sun-setting he expired convulsed and perspiring profusely *." You will read with interest many of the other cases of Hippocrates, especially that of the young man, (liber. iv. lin. 85.) "who fell into this phrenitic

* Erasinum, qui habitabat circa Bootae torrentem, febris vehemens corripuit post coenam, nocte turbatus fuit, diem primam quiete, noctem laboriose transegit. Secunda omnia exacerbata sunt, ad noctem deliravit. Tertia dolorose, multum deliravit. Quarta molestissime, ad noctem nihil dormivit. Insomnia, et ratiocinationes, deinde pejora, et magna, et periculosa, timor, molestia. Quinta mane resipiscebat, ac intelligebat omnia. Verum ad meridiem multum insaniit, continere se non potuit. Extremitates frigidae sublividae. Urinae inconcoctae. Circa solis occasum mortuus est. Huic febres perpetuo cum sudore, praecordia sublimia, distentio cum dolore. Urinae nigrae habentes quaedam in medio suspensa innatantia rotunda, non subsidebant. Ab alvo stercora prodibant. Sitis perpetuo non valde. Convulsiones multae cum sudore circa mortem.

state. "It was, I believe, (says Hippocrates), about the eighth day that he burst out of bed in a furious condition, struck and struggled with great strength, and spoke obscenely, though naturally modest: he fell into a profound sleep, and a critical sweat on the tenth day; but he became again delirious, and died early on the eleventh day, in consequence, I doubt not, of his having drank wine freely before the phrenzy came on*." "Case iv. liber iii. "A phrenitic patient vomited copiously the first day a green matter: the fever was dreadful, accompanied with profuse, universal, continual sweating: the head and neck were oppressed with pain: he passed much faeces: he was sleepless and very delirious: on the third morning, his voice failed, the fever raged, he perspired without intermission, he had subsultus tendinum (palpitationes per totum corpus,) and was convulsed during the night, on the third was worse in all respects, and expired on the fourth." One thus diligent and zealous in the duties of his profession, so industrious in treasuring up knowledge, was well entitled to speak of study with boldness and confidence; it was most natural for Hippocrates to recommend and enforce by precept, what he so well taught by example, and to make that memorable distinction betwixt "*knowledge* and *conceit*, the former of which is wisdom, the latter foolishness." "Duo enim sunt, *scientia* et *opinio* quarum altera quidem scire facit, altera vero ignorare †."

* Qui primus delatus est adolescens, huic urina pura tenuis. Omnium secessus tenuis, multus, sine bile, lingua valde aspera. Febris adurens, insomnis, alvus gibbosa. Hic mente motus est, octava arbitror die, protervum in modum, exurgebat, pugnabat, turpia fortiter loquebatur, quum talis non esset. Huic quum urinae multae tenues prodiissent ex suppressione, somnus obortus est continuus, et sudor, qui judicatorius esse putabatur, ex quo talis erat forte circa decimam diem. Verum postea rursus insaniit, et brevi mortuus est undecima die. Occasionem fuisse puto, quod meracum multum bibisset, priusquam insaniret. Paucos habebat annos, propemodum viginti. Eumenis uxor autumno vomuit bilem atram. Sed et odores manifesti erant, et febres horridae, et cordis, sive osculi ventris dolores, biliosa pauca vomebat, et lumbricum.

† Lex. l. 31. The whole of his observations on the culture and duties of our profession, especially his remarks on natural genius, on discipline, on early industry, and the breathing as it were an atmosphere of knowledge, (a sentiment introduced by Burke into the discourses composed for Sir Joshua Reynolds,) are in the best and chastest stile of eastern metaphor.

Si vero natura ad optima viam demonstret, artis Doctrina facile contingit, quam sane cum prudentia sibi comparare oportet, ita ut a puero institutio accedat, atque id in Loco a natura ad disciplinam apto. Amplius autem et Industriam adhibere oportet: eamque ad multum omnino tempus, quo disciplina ipsa insita, feliciter, et cum profectu fructus suos producat. Qualis enim eorum, quae terra producit, consideratio est, ejusmodi etiam disciplinae Medicinae per omnia similiter existit. Natura enim nostra velut ager est, dogmata praeceptorum velut semina sunt. Institutio a puero cum eo con-

Of CEPHALALGIC PHRENITIS, or Phrenzy, in which pain is the first and most conspicuous symptom. The pain precedes the fever: the disease appears in the young, athletic, and vigorous: the paroxysm rises gradually to its achme: the phrenzy is so violent as almost to vindicate the figurative language of Willis, who distinguishes phrenzy from delirium by saying, "Let us now mount from the description of simple delirium, which is a perturbed state of the animal spirits similar to that which is occasioned in water by a stone cast into a still lake, to that of phrenzy, which is liker the torrents and tides of rivers and the sea, so great is the commotion*. The principal characters of the cephalalgic phrenitis are, the constitution which predisposes to it, the intensity of the headache, the violence of the phrenzy, the deep stupor which ensues, the sudden and invariably fatal termination of the disease, and the state of the brain which is usually livid and gangrenous; and this is never to be forgotten, that it has the peculiar inseparable character expressed in the best definition of Phrenitis, (Delirium a Cephalalgia atroci ut plurimum incipiens,) delirium usually accompanied with fever arising from savage pain in the head." First, the patient is struck with headache, accompanied with heat over all the head, throbbing of the temples, protuberant eyes, and a pulsation so violent that, holding the head between the hands, you feel it jarred and shaken at every stroke of the arteries, but with a visage pale, wild, and haggard, from extreme pain. It is remarkable that, according to the character drawn by Hippocrates, the pain shoots from the occiput along the spine, and the patient, even before the headache ripens to perfect delirium, lies in a state of stupor †: It is from this stupor, that he is roused into a delirium accompanied with demoniac-like struggles and shocking cries, till the whole body is bedewed with perspiration, the hair seems to stand on end, the face is haggard and yellow, the nostrils dilated, the lips quivering, and the hands trembling and grasping, even when the patient is most quiet. But in that inflam-

venit, quod opportuno tempore semina in arvum cadere oportet. *Locus autem, in quo disciplina contingit, est velut ambiens aer, a quo e terra nascentibus numimentum accedit.* Industria autem cultura est. Tempus postremum haec omnia corroborat, ut perfecte enutriantur.

* His ita praemissis circa primum, et levissimum desipientiae modum, ad gradum ejus altiorem, sc. phrenitidem, quae priori affectu longè major, et durabilior est, ascendamus. In delirio, spirituum cerebri incolarum perturbatio, velut aquarum in fluvio à lapide injecto undulatio excitata, verum in phrenesi illorum commotio, quasi fluctuum à turbine insanientium aestus videtur.

† Invadente affectu, ingens capitis dolor aegrum adoritur, qui per occiput, collo, et spinae communicatur; cui mox succedit sensuum omnium tum externorum tum internorum abolitio sicut in apoplexia contigit.

mation of the brain which is to end in sphacelus, he has no rest, he neither slumbers nor sleeps, till he falls into that fatal stupor which is sometimes interrupted by renewed struggles, but always ends in cold extremities, insensible evacuations, and a tremulous pulse: finally, it is conspicuous that the delirium takes its character from the headache, is wild and savage through excess of pain, the patient tears his hair, and lacerates his face with his nails, and where the phrenzy proceeds from fracture of the scull, especially where there is a fungus or protrusion of the brain, he tears off the dressings, and clutches the fungus in his crooked fingers, so as often to tear it up by the root, before the attendants are aware, or to cause great and fatal haemorrhages.

I remember in Riverius an example, communicated by Rufus, of this disease beginning in inflamed headache, and ending in sphacelus of the brain, which will serve excellently well to exemplify whatever I may have omitted in this description: "De Larthaudier a young noblemen, of 37 years of age, was seized during the dog-days with a most acute and dreadful headache, extending principally over the occiput and left side of the head, with slight fever, entire and vigorous senses, but intolerable thirst and unremitting watchfulness: The forehead was not heated; the rest of the head but little so: pressure on the head, though violent, gave him no pain; but, while holding his head betwixt your hands by the forehead and occiput, you might perceive it to be jarred and shaken by the violent pulsations of the arteries, so that the whole head had a pulsatory motion." We find here distinctly expressed, in this first part of this narrative, all the essential signs of idiopathic inflammation in the brain. The next paragraph explains the decisive and prudent measure taken by Rufus to prevent its rising to any fatal excess.

"Fearing Erysipelas, (says Rufus), or an abscess in the brain, we proceeded instantly to take away two pounds of blood, bleeding our patient first in the cephalic, and then in the median vein. During the ensuing days, the pain continuing excruciating, we took, at separate times, two pounds of blood from the opposite arm, and, on the fifth, we administered purges: on the 6th, we applied cupping glasses to the shoulders, by which we discharged half a pound of blood: the head was shaved, and cold vinegar and water poured over it, nor the slightest thing being omitted which might serve, according to our apprehensions, to appease the inflammation of the brain.

"It was on the 4th day, that a carcinomatous looking tubercle, hard and hollow, appeared on one side of the tongue: on the 7th, the patient was high-

ly delirious, the sweat broke on his forehead, and soon after distilled from every pore of his body, so that we flattered ourselves with the hopes of a perfect crisis: he was wiped and dried; the linens were changed; the sweat broke out again: he now began to complain of the bed-clothes being oppressive to him; he cried out that he was suffocating. Having upon this stripped him, and wiped him anew, we found him almost paralytic, and continually delirious: his strength, which before this exhausting perspiration was very entire, was now quite gone: he lay all night, (the 8th of his disorder), till nine in the morning, apparently exhausted, in a state of idiotism, muttering incessantly, and talking confusedly of every thing. On the 10th, he seemed to revive; and we might have been seduced into false hopes of his recovery but for the tremulous pulse and convulsed members which shewed the brain to be fatally affected. The urine now flowed freely, and was of a flame colour; but towards evening, and on the very same hour with the attack of the preceding day, the delirium returned, and so much the more furious in proportion to the degree of strength he had recovered during the intermission: he was furious and powerful, so as to terrify his attendants, and put them to flight. About nine in the morning, he fell low again, and continued so till evening, when a boil rose on his neck to the size of an apple, but neither painful nor discoloured. Still the delirium continued with convulsive motions of the arms; on the 10th day, every thing bore the same aspect; on the 11th, he expired in convulsions." Hippocrates says, in his Prognostic, "Quibus cerebrum sphacelatum est in tribus diebus pereunt;" but we see them sometimes, as in the present instance, survive to the tenth or twelfth day.

"So unusual and violent a death was a motive with his noble family (to whom the disease was particularly interesting) for permitting his body to be opened. Every thing was sound, except the brain: Upon raising the scull-cap, much black and fluid blood flowed out; it began to flow even before the scull-cap was raised the breadth of the blade of the saw, and the quantity disgorged from betwixt the scull and dura mater (for the membranes were still entire) was estimated at two pounds. The membranes being now cut, the veins of the brain were seen universally dilated with dark coloured blood; but in the back part of the brain and towards the occiput, and about the place of the Torcular Hierophyli, there was a space, of two inches broad and four long, black as a coal, apparently gangrenous, and, the scalpel being struck into this part of the brain, there flowed out from five to six ounces of very foetid pus; and, in the process of the dissection, this gangrene was found to extend over all the basis of the brain, and especially over the cerebellum, and that part of the

medulla oblongata which lies within the ring of the vertebra atlas, the precise point at which the outward tumour appeared; but, on the left side, the membranes of the brain were eroded, whence it is most probable the blood inundating the brain in general had flowed."

To these descriptions and this admirable example of the disease, I can have nothing to add, unless it be that, in this instance, the cause of such horrible phrenzy and gangrene of the brain was, that this nobleman, naturally of a hot and bilious complexion, in the flower of his age, and in full health and strength, had plunged into the river, after being exposed to the heat of the meridian sun, a cause from which many of our fatal brain fevers arise.

Of the MANIACAL PHRENITIS, or Phrenzy resembling Mania, in which there is no symptom of fever, no complaint of pain, no sign of inflammation, but sudden uncontroulable phrenzy: where the disease of the brain seems to arise merely from distracting thoughts, disorderly passions, from resentment sometimes, but chiefly from fear or shame.—I have remarked it chiefly in those of a sallow and melancholic temperament, whose brain has been inflamed by deep, abstruse, long protracted studies, by violent political altercations, or by family quarrels: I have known it arise from the disgrace of having refused a challenge, from the fear of political degradation, from the contentions of an election; from the violence of debates in public meetings, and the agitated feelings with which a man of strong passions has retired into his own family. No pain precedes, no fever accompanies this state of the intellect; there is at first more of imbecility than phrenzy; the patient is suddenly seized with a sort of fatuity, huddles up the letters or papers with which he has been distracting his imagination, wanders in solitude from room to room: his visage is pale and grim, and his eyes inflamed: he talks wildly and incoherently, sometimes laughs in your face sillily, sometimes grins: he puts off and on his clothes; is in and out of bed often in the course of a few minutes, without apparent design: when you think him beginning to be composed, you find his delirium, (in the space of the few hours that pass in this state of disorder,) concentrating into fury; he grins, spits, fixes his features, and extends his hands; sets himself up in bed in postures as if stiffened with convulsion; stares stedfastly in your face, as if with design to alarm you; and grins like a fiend, with such horribly distorted features as you sometimes seem to have before you in a perturbed and feverish dream: then comes on, and in a very few hours from the first attack, a wild and frantic delirium; the patient foams at the mouth, while the body is dissolved in sweat from the violence of his struggles: You now find

that no intreaties nor commands can engage him to lie a moment still, or stop the fury of his struggles; you cannot restrain his motions by any force which is not in danger of hurting him, except by wrapping him in the twilt, or putting on the strait waistcoat: when restrained from striking he kicks; when you hold his hands and legs, he rolls his head incessantly from side to side, and sputters out the foam, gnashing and grinding his teeth; his cries are very distracting, and in a shrill and piercing tone of voice; when he drinks, he drinks greedily and promiscuously whatever is presented to him, and often bites the cup: the features are pale, or yellow, and ghastly, the hair standing on end with sweat and struggling, the limbs trembling when not struggling, the hands shaking when not grasping, the lips convulsed, the nostrils dilated, the neck stiffened by a rigid contraction of all its muscles, and the platisma-myoides, especially from its contracted state, gives the neck a skinny form, and draws down the moveable features, especially the corners of the lips; the eyes are protruded, and in perpetual motion, the pulse in a continual quiver, till at last the body, bathed in profuse sweats, becomes cold and clammy, the faeces and urine pass involuntarily, the patient only mutters, becomes paralytic, and expires on the third day. It is difficult to prevent the patient injuring himself, so violent and unceasing are his struggles, and impossible to prevent his lying in the most loathsome condition, for while all the assistants are employed, (and all the friends who can endure such a scene,) in resisting his struggles, the faeces and urine are continually flowing into the bed: you change his linens and bed incessantly, but in vain, from the perspiration and ordure, and the spilling of whatever drinks or medicines are given him.

Here you perceive the strong distinctions betwixt phrenzy, or the violent delirium of an inflamed brain, and madness, (a subject which my present limits, I speak it with regret, will not enable me to discuss); for here there are no suspicions, jealousies, resentments, passions, no mark of perverted reason, nothing but unrespective fury, cries, and struggles, without meaning or design, the reason quite overturned from the first moment of the disease.

So true is it that, "the disease being known, the cure is easily discovered," that I do not feel it to be at all a duty to speak pointedly to this, or to say more than that the febrile and cephalalgic delirium require profuse bleedings incessantly repeated, sickening emetics, severe and drastic purges, nitre and cooling drinks, the

application of cold solutions to the head *, and the pediluvium or tepid bath : that in this disease, which I have last described, in this maniacal phrenzy, where there is no headache, no fever, and only a quick and quivering pulse, I think I have stopped its course, by subduing the strength entirely, by severe sickening doses of antimony, such as would poison one in health, and then giving opium, which I confess I am yet averse from using in diseases of the brain.

Of Vomica Cerebri, or Imposthume of the Brain.—You must have observed that, in some of the diseases lately described, part of the brain had suppurated, while much of it was actually in a state of gangrene ; but such general suppuration of the brain, though certainly worthy of being described, is comparatively rare. There is a description of this combination of suppuration and gangrene, proceeding from rapid and intense inflammation, and accompanied with phrenzy and fever, which I think it will be acceptable that I transcribe for you ; it is short, comprehensive, and very accurately descriptive of the usual tendency of this disease ; it occurred to Mr Bailly, a celebrated surgeon of Geneva, who " having gone to Tholouse to visit the Prior of a college for the education of young noblemen, (one whom he had formerly cut for the stone), there was brought to him a rich farmer of the neighbourhood, named Claud Bertrand, forty-two years of age, who first complained of intolerable pain seated in the forehead, a little towards the right side, and under

* Whether the cold ablutions may be carried farther, my readers may judge from the following narration of a case, in which a stout servant girl did, in the literal sense of the word, swim for her life.

Olim ad Ancillam robustam, quae febricitans, et summè insaniens, continue in lecto vincta tenebatur, curandam accersebar. Huic sanguinem copiose, et dein iterato mitti, alvum ab enemate crebro subduci, quin et alias quasque administrationes, in hoc casu usitatas ordine celebrandas praecepi ; interim julapia, emulsiones, et hypnotica propinari : Verum his parum aut nihil juvantibus, per septem, vel octo dies illa insomnis usque, et furiosa admodum perstitit, potum frigidum ejulando, et clamando perpetuo exposcens ; quapropter hydropotia, ad libitum immo ad satietatem concessâ, nequaquam sedatior, aut sitibunda minus facta est ; itaque (si quidem tempus aestivum fuit) ut media nocte a mulieribus sublata, et foras perducta Cymbae imponeretur, dein vestibus exuta et vinculis soluta fluvio profundo immergeretur, fune tantum circa corporis truncum, ne forte submersa interiret alligato ; verum istiusmodi, retinaculo nihil opus fuit, namque puella ut vix melius vir quispiam artem hanc probè edoctus, sponte natabat : post tertiam, aut quartam horae partem, sana, et sobria aquis eximitur, dein lecto commissa dormivit, et copiose sudavit, posteaque sine alio quovis remedio convaluit. Curatio haec tam subito, feliciter successit, in quantum flamma tum vitalis, tum animalis simul immensum auctae excessus, a proprio ignis intensioris remedio, sc. humectatione, et infrigidatione ab aquis tollerentur. *Willis*, p. 238.

the coronal suture, which he ascribed to being exposed to the heat of mid-day in a light thin cap: the sun beat long and violently on his head, and he passed the succeeding night in the open air; next morning he was seized with his disorder, which began with a gravitating pain within his head, a burning fever, nausea, rigors, watching, and extreme anxieties, with eyes fiery, red, and blood-shot: phrenzy came on the 5th day, and the physicians of Tholouse prescribed the usual remedies, but he expired on the 9th day; and a foetid pus having distilled from his mouth, nose, and ears, especially his right ear, the friends allowed his head to be opened.

"Upon raising the scull cap, there appeared an abscess, of the size of a walnut, which, being opened, poured out a greenish and extremely foetid pus, while both dura and pia mater were touched with gangrene."

This is not vomica or abscess, but a diffused suppuration mixed with gangrene, brought on by universal inflammation of the brain: Vomica is an encysted abscess, which, though equally fatal, differs altogether in its signs and consequences; it is local; it is marked by pain so limited, that the patient can cover with the point of the finger the part diseased: it is accompanied with delirious headaches, but though the pain never entirely ceases, the paroxysm recurs at great intervals of time; and when the abscess extends, and trembling or convulsive motions follow, when at last, in some more violent paroxysm, the inflammation extends over the whole brain and proves fatal, stupor precedes death; and, upon dissection, the brain and its cavities are found suffused with serum, and the Vomica, like abscess in other parts, is surrounded by a firm and circumscribed sac. Such is the disease, which perhaps I should describe more accurately, before I either pretend to ascertain the nature of the abscess, or venture to guess at its cause.

When a man in full health and vigour is struck not with headache, but with acute intolerable pain within the cranium, fixed to one spot, and such pain returns from week to week with aggravated violence; or when a delicate woman, not unaccustomed to headache, has a poignant intolerable pain under one parietal bone, or in the occiput, so circumscribed that she can cover the pained part with the finger; when the general headaches seem to arise from this more local pain and giddiness, langour, and fits of fever, with slight shivering, accompanying each paroyysm; when at times the patient throws herself down in agonies flat upon her bed, holds the head firm betwixt her hands, or requests her

friends to press it with all their strength; when, after such pain raging for some hours, there comes on giddiness and confusion of head and delirium; when distracted and wild with suffering, and no longer conscious of what she does, tears her face and her hair; when after weeks or months of suffering, she becomes so much impressed with the belief of something forming within her head, as to intreat to have it opened with instruments, there is every reason to fear that she is not mistaken that a fatal abscess is actually formed in the brain. Yet after months of melancholy suffering, and even when death is approaching, the reason is entire! then every attempt to walk is followed by sickness and staggering vertigo: she begins to wet the bed: paralytic weakness and slightly convulsive tremors affect her limbs, a stupor follows, and she expires placidly, or but slightly convulsed.

Upon opening the head of one who has died of this disorder, there is found, along with a general enlargement of the ventricles and effusion of serum, a circumscribed and regular abscess involved in a thick and firm sac. It is because the abscess is thus sacculated that its progress is so slow, the health so gradually ruined, the reason so slightly affected; the occasional paroxysms of pain and slight delirium mark the several accessions of inflammation and successive enlargements of the abscess, and it is by propagating the inflammation over all the brain, that it is in the end fatal.

But how such local abscess should form in the brain where no glands subject to such diseases are known to exist, where no extravasation of blood, such as causes abscess in other parts and organs of the body, can take place without producing instant death and palsy, in an organ, too, where apparently no outward injury can reach the part, is indeed difficult to conceive. Nor is it less wonderful, that, seated within the delicate substance of the brain, such abscess should continue circumscribed, grow slowly, encroach upon the brain and waste its substance, yet hardly affect the faculties of the mind: that it should form for itself, out of the delicate cellular substance of the brain, a sac as thick, firm, and regular, as if it were seated in the thigh: Yet these are indisputably the circumstances in which this vomica cerebri, or circumscribed abscess of the brain, are always found; and were I to relate to you a hundred instances of this disease, each narrative would conspire to prove one or more of these circumstances.

I must now prove to you, by probable inferences, that such abscess does actually arise from some slight rupture among the vessels of the brain; for which end, I shall proceed to analyse a case, a most interesting one: it is not, indeed, so sur-

prising that those having, from rupture of the smaller vessels, slight lacerations in the substance of the brain, should have small abscess formed around the extravasated blood, as that those struck with palsy (assuredly proceeding from bloody extravasation) should escape them.

" The subject of the following disease was one who had lived a regular life and enjoyed perfect health, till in his fortieth year he was afflicted with many misfortunes in trade and in his family, for he was an artizan and not opulent. Thus, he became melancholy, and having consulted a low and ignorant person, he ordered him a strong antimontial emetic; after which, having taken copious draughts of cold water, and exposed himself at the same time to cold air, he suddenly fell down to the ground in an epileptic fit; and when he recovered from this convulsion, he was affected with such irritability of the left arm and hand, and with such an exquisite sensibility of the surface, that even the slightest breath of cold air upon the parts brought on convulsive twitches not only in the arm, but in the muscles of the mouth and face, and, indeed, over all the head; and on any remarkable change of the atmosphere, or even by the natural variation of the seasons, and especially by any violent passion, he was so affected as to fall down in fits of proper epilepsy.

" Such was his distressed situation during four years; and all the while he complained of an obtuse and heavy pain, in the left side of the head, under the parietal bone. This pain varied in its degree of violence, sometimes it was absent altogether, returning occasionally in paroxysms more or less excruciating; and the patient, while he marked the place of the brain occupied by this pain, expressly declared it limited to a space no bigger than an egg."

" During the last year of his life, he had the haemorrhoidal flux in a remarkable degree, and during the four years of suffering he had tried the prescription of various physicians: an issue was made in the affected arm, and, that being healed, a seton was made in the neck, and during the last year a seton was also kept open in the affected arm, and every morning and evening it was dry rubbed with rough cloths impregnated with the gums of mastich, olibanum, amber, camphor, &c. and anointed, after each rubbing, with various spirituous oils and liniments, while various purging, nervous and aromatic medicines were given in every variety of combination, but without the slightest advantage."

" Wearied with ineffectual endeavours to regain his health, and anxious to leave nothing undone, he requested most earnestly to have those mineral waters given him which he had heard and read of as so useful in such complaints. He had used

seven bottles of an acidulated mineral water, but the only effect was loosening his belly; and, on the last day in which he used those waters, he had an evacuation of a small quantity of clear mucus, such as old writers have chosen to name "pituita vitrea;" his appetite, which had almost vanished, was now restored."

"Next day, while taking, by separate doses, the eighth bottle of this water, he was seized with vomiting: the water being rejected, beef tea was next tried, the second draught of which he also vomited; and now the pain, which he had felt all along under the right parietal bone, was greatly increased; it became intolerable; and the ointment of axunge and balsam of rue, from which he was wont to have relief, was tried in vain: this excruciating pain continually increasing, a bread poultice was next applied, with juniper berries and a little common salt; but next day he fell into a complete stupor, and while he was taking a nervous medicine of castor, amber, &c. he expired before he had taken much of it."

"The liver was more crammed with blood than usual, the abdominal veins, especially those of the stomach, were very turgid, but the viscera, being otherwise sound, we turned next (says Baader) to examine the head; and there, upon removing the scull-cap and membranes of the brain, we found in that part where, during life, he had marked the seat of his pain, both the cineritious and medullary substance of the brain greatly harder than natural and truly schirrous; and underneath this indurated part of the brain, which the patient had so often marked with his finger, was an abscess the size of an egg, its cavity filled with a granulated and yellowish mucus matter, it was encircled, and its basis formed of a substance livid and reddish, painted with delicate vessels in a state of inflammation *".

The points of proof in this case are very conspicuous: first, a man arrives, through a troubled and melancholy life, at a period in which we are most subject

* This case was taken in the Poors-house of Vienna where the head was dissected. The following are the original notes of the dissection; the above is a close and servile translation of the case.

Remoto segmento cranii, ablatis integumentis cerebri interioribus, in illa cerebri plaga, in qua durante vita aeger de dolore conquaestus est, substantia corticalis cum vicina medullari solito multum durior ac vere schirrosa deprehénsa est.

Infra hunc locum induratum, quem defunctus saepissime digito monstravit, abscessus latius ori gallinacei magnitudine.

Cavum hujus apostematis replevit materia flava, granulosa, mollis, mucosa; fundum ejusdum occupavit, et investiit, substantia ex rubro livida, in qua vascula subtilissima inflammata apparuere.—*Baader, page* 113.

to palsy, the fortieth year; and then, after a strong antimonial emetic imprudently given, he falls down epileptic, and when he revives, has paralytic and convulsive tremors of the left arm, and twitches of the face and mouth demonstrating the slighter degree of palsy. Secondly, he has from that moment, and during the four succeeding years, along with these slighter signs of palsy, a continual obtuse gravitating pain, and this dull obtuse pain is interchanged with occasional paroxysms of intense and acute pain, with a constant persuasion that he can point out the express seat of the disease, and that it occupies a space equal to the size of an egg. Thirdly, the physicians continue fumigating, rubbing, and fomenting the arm, tormenting, with issues, a part where, though the signs of the general disorder appear, the disease never could have its seat. Fourthly, his approaching death is announced by vomiting and stupor, intolerable and raging pain, the abscess had subsisted four years without affecting the faculties, till now that the inflammation suddenly extends over all the brain. Fifthly, the substance of the brain is found in this dissection to be subject to the same changes with other parts of the animal body: the size of the abscess (large as the biggest hen's egg) the schirrous firmness of all the surrounding substance of the brain, the thick, solid, and fleshy firmness of the tunics surrounding this vomica, for so I think we may translate "substantia investiens ex rubro livida;" and, finally, the state of the secretion within this abscess, not pus recent or immature, but viscid mucus, and granulated, as matter always is when long inclosed in a sac, and exposed to continual secretion and absorption: and, finally, the walls of this cavity, being covered with conspicuous blood vessels, show how long and how powerful the vascular action had prevailed, and by how many successive paroxysms of inflammation this disease had been brought to maturity.

These are conclusions so very important, that it is almost a point of duty to confirm them by other facts; and without detaining you to hear a long and desultory narrative, I will lay before you the analysis of another case: it is not one of the class of wonderful and extraordinary cases; it has in it nothing difficult to believe, nor out of the daily course of practice; it is interesting for the truth and simplicity of the narrative, and for the interesting conclusions which arise out of the most simple facts *.

* While I deliver the analysis, I cannot think myself entitled to withhold the narrative, which I have translated correctly and literally.

"Ursula Aberling, unmarried, and twenty-three years of age, was one day carrying a bulky and very heavy load of grass from the fields, *when she felt as if something within the head had given*

"A young and hardy woman, in the prime of life, inured to the coarse and laborious occupations of a farm, while carrying a load of grass upon her head, felt all at

way: Soon after this, while carrying dinner to the reapers, with plates, &c. upon her head, up to the higher grounds, she felt herself so oppressed with the weight that she almost sunk under it, but there was no one to help her: she struggled up the hill with her load, *and then she again felt something give way within.* From that hour she was sensible that she could not retain her urine the usual time, yet she continued her labours as usual: a churlish father held her to her work, which she performed without complaining, her menstruation continuing regular. On the 22d of December 1657, without fearing any ill symptom, she walked so fast to church that she was greatly heated; and, being chilled by the coolness of the place, she instantly felt herself powerless in the left leg, dropped upon her knee, and was prevented by the person next her from falling forwards: she was struck powerless in all her left side: her mouth was distorted, and her lower jaw drawn towards the right side; and although at first she spoke intelligible, in a very little while she could not be understood: the by-standers, believing her to be in a faint, though her cheek still preserved its natural colour, sprinkled her with cold water. Being carried home paralytic of one side, she continued delirious for fourteen days, complained *of a raging pain in the back part of her head, as if the hair had been continually torn from the scalp, while the right eye was tortured as if it were continually torn out of its socket.* In her left side she was entirely paralytic, but, except the loss of power and sensibility, felt not the slightest uneasiness; during the first days, she passed urine frequently and in great quantities, yet without wetting the bed: she complained only of headache, nor had she any medicine, except, from an old woman, some cephalic waters. On the 7th of February, I was called to her at eight in the morning, on account of a paralytic stroke, when she appeared to me fleshy and well coloured: the distortion of the mouth was not great; she spoke freely and distinctly, nor did she complain much of pain in her head: her left arm, indeed, she could not move of her own accord, but, upon pressing the arm a little with the points of my fingers, she withdrew it a little; her left foot she could rest upon a little, but could not move it forwards; both the leg and arm of the left side quivered, from time to time, with a sort of convulsive tremor; she ate with moderate appetite, was well in all respects, and her menses flowed with the regularity of perfect health. I ordered decoctions of rosemary and other cephalic herbs, nervous liniments, occasional purges, and a suitable regimen. Having continued to follow these methods for some little time, she gradually recovered strength in the left leg, and during all the summer crept abroad upon a stilt, and frequented the church; *but her headaches soon returned, and were aggravated by wine,* wherefore she continued during *the whole summer to drink water or goats whey, and always she preferred what was cooling to any thing warm, so that she lived upon milk, acids, unripe fruits, &c.* and often through the whole day ate nothing but a slight breakfast. One morning in the month of August 1668, when rising from bed, she felt languid and powerless, and complained of pain in the soles of her feet, which, though apparently sound, were so tender that she could never after stand upon her naked feet. After this the pain, especially in the right side of the head, returned; now it was in the occiput, now in the forehead, now in the temple, now in the top of the head; it was most excruciating: she cried out that there was a gathering, a beeling, in the top of her head just

once as if something had given way within. Soon after, in toiling up hill in a sultry day in autumn, her head loaded with plates, utensils, and a dinner for the reapers, the whole body straining, the head and neck loaded, the circulation of the brain accelerated, she again felt that something within the head had given way.

From that hour she was sensible that she could no longer retain her urine as heretofore: she continued, though enfeebled, to work, because compelled to do so by a churlish father.

Again, in walking to church very fast, flushed and heated, and suddenly exposed in so damp a place to the cold and chills, there happened, in consequence of the high arterial action, which this excited, an addition to the first extravasation: for she fell down powerless of the left side, dropped first upon her knee; was supported and prevented by those near her from falling; and, when raised and recovered from her faint condition, was found palsied in all the left side, with distortion of the face; and, with this third partial effusion, there came on a degree of inflammation, for she continued delirious for fourteen days, with a sense of pain so peculiar in the scalp and eye of the right side, that it seemed as if the hair were continually torn out, and the eye tortured and twisted out of its socket.

From this time, headache became a fixed and permanent ailment: of the palsy, she recovered slowly and imperfectly: she was conscious that wine hurt her head, and therefore lived on whey and fruits: she crawled slowly to church, and continued to trail the legs.

ready to burst, and begged that it might be opened; often she was seized with such giddiness that she believed herself falling, and felt the brain disordered chiefly in the right side: still she walked, but felt the paralytic arm so heavy that it seemed to draw her forward. When the winter advanced, partly from the abuse of cooling diet, from her sedentary life, and neglect of the proper medicines, she became aedaematous: her ancles swelled, and her belly became tumid: In January the menses first disappeared; rheums seized her chest; the cough was distressing; the breathing difficult: she often brought up little clots of blood; but, when the cold went off, she breathed freely, and lay down with ease, and slept with the head lower than those who are dropsical usually do. The dropsy increased, the belly swelled more and more, the loins became aedaematous, the right foot was grievously pained. On the 23d of March, I found her dying; the legs, arms, loins, and all parts, being completely dropsical: She had the Hippocratic face, cold extremities, a clammy tongue, a pulse extremely feeble; in the lower extremities livid spots appeared, and the right leg was threatened with gangrene: for some days she was delirious, but became sensible towards the approach of death, and her sight and hearing were perfect even to her last breath.

One morning, at the distance of a year from her first feelings of something giving way within the head, she seems to have awaked with the sense of having suffered a slight paralytic stroke, or at least with feelings of particular feebleness and languor; and, from this period, was afflicted not with headache only, for that implies a general disorder, but with pain of the head apparently fluctuating from the occiput to the forehead, limited to the right side: she also cried out with agony, and was conscious of a suppuration, and besought them to open the part: she was affected with excruciating pain, and was almost delirious; she was so giddy, that she continually imagined herself falling down, yet her weakness increased but very gradually: she wasted slowly, was, towards the end of her trouble, delirious for a few days, but recovered her senses before death.

You will easily distinguish (the cause of her illness, and the manner of her death being considered) betwixt the horrible symptoms produced by a brain universally inflamed, and by a local disorder such as this; for there was found in the right ventricle, within the bounds of that cavity, but involved in strong and peculiar coats, an abscess as large as an egg, while the brain was universally suffused with that

"On the 25th of March, we, by bribes and intreaties, obtained leave to dissect the body."

"The spots on the legs seemed to have grown broader and more livid; vesicles began to arise, and serum sweated through the pores of the skin; the abdomen was flattened, and a viscid and yellow mucous flowed from the mouth: a thin, ichorous, and uncoagulating blood distilled both from the vessels of the integuments, which were opened with a crucial incision, and from those of the scull itself. Upon lifting the scull-cap, a quantity of serum covered the dura mater; the falx being cut away from the crista galli, and turned back, the whole surface of the brain appeared covered with a transparent yellow jelly, which filled up the convolutions, and gave an evenness to the whole surface. The pia mater being opened, a profusion of thin and yellow serum flowed out; and the brain being cut to the level of the right ventricle, instantly a turbid serum burst from it; and in this much dilated ventricle there was an abscess, as large as a hen's egg, inclosed within its proper coats, of considerable thickness, (peculiari tunica crassitiae pennae collumbinae vestitis), one end of the abscess stretching outwards towards the temple. The sac being opened, a turbid and yellowish serum flowed out, which being evacuated, the substance of the brain, at the sides and bottom of the sac, seemed corroded and ulcerated; for, the mucous being cleaned out from the floor of this cavity, the little knobules of the brain stood out prominent and ragged: in this sac no opening could be found, neither by pressing before, nor by searching after it was opened: Both in the left ventricle and in the right, I found serum, but in small quantity, and more limpid; whence I conclude, that in *the right there had been two follicules, one of which had been* inadvertently opened. Upon taking away the brain and cerebellum, and cutting the spinal marrow, much serum flowed upwards through the occipital hole."

serum which always exudes from inflamed surfaces, and which, in this instance, burst out at every new incision, from the act of raising the cranium, to the incision into the ventricles; serum inundated all the surfaces of the dura mater, pia mater, and cavities of the brain, while a transparent yellow jelly filled the cellular substance of the pia mater, and levelled all the convolutions of the brain.

Of Vomica Hypocranica.—As the abscess generated within the substance of the brain is distinguished by the name of Vomica Cerebri, that which is exterior to the brain, hardly more accessible to the surgeon, or less fatal, is distinguished by the name of Vomica Hypocranica; Vomica as expressing the sacculated form of the abscess, and Hypocranica as implying that it is found under the cranium on the surface of the dura mater, and such abscess has been universally imputed by the above writers to extravasated blood. Their doctrine of the cause of Vomica, you may easily believe, I am little inclined to dispute; it was indeed founded on observation. Often Pathologists, when in the first instance they had reason, from the circumstance of a blow or a stroke, to believe that blood was extravasated, found, in the second instance, a collection of pus, and they were ever ready to account for every phenomenon, and especially for this conversion of blood into pus, which they ascribed to heat, stagnation, and putridity. The absurdity of their theory does not deter me from approving the truth of their observation: this opinion of the conversion of blood into pus is copied from Hippocrates, who says, "Sanguis quinque aut sex mensibus in utero immoratus, ibique putrescens, in pus vertitur, quod quibusdam per pudendum extra fertur:" upon such hints, the commentators never failed to improve: the circumstances of the menstrual blood, thus detained within the womb, were again enumerated as equally natural to blood stagnating under the scull, or in the sinuses of the brain. "The blood stagnating in these canals, heated beyond measure, mixed with corrupting phlegm, wanting too the benefit of ventilation through the sutures, is at last (says these pathologists) converted into pus, and forms an abscess.* This is the sum of their theory of Vomica: the formation of the sac is accounted for by a more elaborate and learned theory, which is best, and perhaps first, laid down by the Dutch surgeon, Arn. Boot, who shews, that "whether the stagnant blood be extrava-

"* In horum ductum seu canalium (says Boot) restagnans sanguis, se plus justo calescat atque inflammetur, tandem in pus abit, atque abscessum constituit; but, that no circumstance might be unexplained, he adds, "Fit igitur haec inflammatio quando sanguis iste multa falsae pituitae admissione infectus, et plus quam par est calefactus amittit, eodem tempore beneficium *ventilationis* per compages suturarum, &c."

sated by a shock, or whether it merely lingers in its passage through the sinuses, Nature, to prevent the diffusion of the blood and purulent matter over the brain, weaves a web of cellular substance, cross-ways and long-ways, gluing thread to thread, till a sufficient, firm, dense sac is formed, just as the fecundating semen is, as soon as received into the uterus, involved in the necessary membranes; and in this sac is the blood changed, ripened, and converted into pus."*

In such vain theories there are often involved practical facts, which it becomes you to know; those implied in the present theory you should be careful to remember: Such abscess under the cranium, which was ascribed to the stagnation of blood in the angle of the great sinus, viz. at the corner of the temporal bone, is really more frequent at that point, because of the spongy nature of that piece of bone, because of the complicated and delicate organ of the ear which is seated there, and because of the frequency of scrophulous caries at this point. When such abscess is unexpectedly found, it is usually at the occipital angle of the temporal bone; and from such abscess many escape alive by the fortunate effusion of the pus from the abscess through the ear. This is especially frequent in delicate and scrophulous children, and sometimes in the adult, as in the case of a London citizen who had for six or seven years been afflicted with pains in the head, and, as he lived in a city abounding with medical practitioners, had gone through no small variety of prescriptions, without effect. Walking, one winter's day, in the streets, he was all at once relieved by an operation, (performed by an unknown hand) rather more fortunate than delicate; for he was hit so lucky a blow on the ear with a hard rolled snow-ball, that the matter of this long formed abscess instantly burst forth, and he long survived this fortunate blow in perfect health. But Vomica is a disease not un-

* Vomica Hypocrania—Est aliud inter cranium ac meningem abscessus genus in devexiori capitis *parte ad alterutrum latus, secus ossa petrosa, oriri suetum,* non ex sanguine cum alienis humoribus affatim permixto, uti illud modo explicatum, sed ex mero simpliciq; (qualis in venis continetur) *idq; inter cystin propriam,* cujusmodi abscessus peculiari nomine Vomicae appellantur. Origo illi ab externa violentia, validoq; capitis ictu aut illisione, unde rupta aliqua ex venulis Cranium vel Meningem perreptantibus, aut hanc illi alligantibus, sanguinem in intermedium spatium profundit: *cui solers natura confestim tenuia quaedam ex ipso fila deproperans, ac undiq; retis instar circumtendens, iisq; alia super aliis interserens, ac obliquis quoq; transversisq; fibris omnia intra se firmiter atque arcte ligans; eodem artificio, quo membranae in utero semini genitali statim a conceptu circumdantur, parvo temporis spatio detexit firmum densumq; folliculum, intra quem conclusus cruor paulatim a statu suo demutatur, atq; in pus excoquitur.* Hic Abscessus, seu folliculus pure plenus, semper una in sede stabilis permanens, quum neq; evagandi spatium detur, ut qui emissis quoq; quibusdam filamentis vicinae Meningi alligetur.

frequently fatal* ; and, seeing that is so, we must be always watchful when that suppuration in the ear, by which so many children lose the hearing of one ear, is attended with outcries of pain, want of sleep, restlessness, tossing, fever, and continued headaches : then strong purges and opiates are to be given ; leeches to be applied behind the year ; a tepid solution of opium poured into it ; a large poultice, with camphorated oil, laid over the side of the head, and every thing done to prevent the extension of that inflammation and abscess to which we sometimes see delicate children fall victims.

That you may be fully aware of all the forms of inflammation in the head, of what is possible, as well as what is frequent, I shall close this subject with a narrative in which you will see the head affected like a limb with universal suppuration, external as well as internal ! the whole head suppurating at once, within and without, in the skin, and in the brain, in all its cavities, and all its cellulur substance. The case is related by Bursarius ; the dissection was performed before him, by Dalarenius and L. Benedictus, then his clinical clerks. " The case was that of a young woman, twenty five years of age, who, after being afflicted during fifteen days with dreadful pains of her head, requested his advice, for then her eyes began to be effected, her eye lids to

* " Elizabeth Erot, wife of a watch-maker of Leiden, twenty-three years of age, a very fair and delicate young woman, had from her infancy, from the time at least of her having the small-pox, a running from one ear, accompanied with a frequent severe disorder in the head. In the ninth month of her pregnancy, when this flux of matter from the ear was less than usual, she was attacked with dreadful pain, such as drove her almost delirious ; the pain was seated in the vertex, where she begged of her friends and attendants to press firm with the hand. The head was shaved, the scalp was fomented with warm milk, cleansing injections were thrown into the ear ; on the seventh day of this distress, Spon, being a second time called, found the pains greatly increased, with a tremulous and spasmodic affection of the arm ; next day, the labour pains came on, and in the evening she was delivered of a daughter, a healthy child. Then we were not without hopes, (says Spon), that the profuse flow of lochiae would carry off the disorder, and willingly left it to nature. But the excrutiating pains of the head increased in violence : the tremulous or convulsive motion of both arms increased : she had an injection ; a poultice of bread and milk was applied over the head, then the cataplasm of J. de Vego. But, the disorder still increasing, this excellent young woman died in a few days."

N. B. Suppurations about the head are frequent in pregnancy : if ever a gland of the neck or jaws swell during labour, never expect to see it discussed ; it always suppurates.

" When lifting the scull-cap, both the coverings of the brain appeared much inflamed ; and, upon opening these, a great abscess of the brain appeared ; it had been inclosed in its particular sac ; its bursting abroad into the brain was the immediate cause of death : that portion of the temporal bone which projects into the basis of the cranium was very remarkably diseased ; it was still invested with its dura mater, but black and carious, so that upon the touch of the probe, it crumbled into powder."

swell, her whole face, but especially around the eyes and eye-lids, was puffed up into an immense tumor; the cheeks were also greatly inflamed, the redness disappearing for a moment upon pressing with the finger. The eyes then closed altogether; the fever increased with great anxieties and oppression; the cellular substance suppurated, and the matter burst out from the angle of the eye and through the prominent part of the cheek: the eyelids, being thus somewhat emptied, could be forced open to inspect the eyes, when the cornea was seen, as in chemosis, almost concealed in the projecting adnata, the adnata fleshy and red, the cornea itself clear, but the pupil dilated as in mydriasis, and the eye insensible: four days after the bursting of the abscess, came a universal convulsion; universal palsy succeeded; the respiration became stertorous, languid, and irregular, the pulse feeble, irregular, intermitting, and thus the young woman expired:—Upon dissection, the cellular substance of the eye-lids, cheeks, and face, down to the angle of the jaw, was found to be destroyed, and full of putrid pus: the globe of the eye was unhurt, the humours entire, the cornea somewhat opaque; the head being opened, it was found that the left hemisphere of the brain was wasted by suppuration, while the pus was lodged in a particular manner round the optic nerve of the palsied eye.

SECTION III.

But this disease is not thus fatal if either it burst spontaneously before the brain be deeply affected, or the part be trepanned so as to make a free passage for the matter. The following case from Morand's Opuscles de Chirugie is a proof how much may be accomplished by careful surgery:

"A Monk, living in the monastry of the order of St Bennet, in Bourbon, about fifty years of age, having been subject for some years to rheumatisms, was struck all at once with violent pains in the head, especially in the left ear, with stoundings and a noise as of the rushing of water. This disorder was accompanied with fever; and after a few days, a yellowish pus burst from the affected ear. Various remedies, as blisters upon the part, and injections into the affected ear, were used with advantage; only this was particularly remarked, that when the discharge stopped, the pain increased, and a caustic being applied, the pains became insupportable, with an intermitting fever and total loss of hearing in the affected ear. All kinds of remedies were tried in vain; the patient's sleep left him, and no posture gave any relief.

"Now, an abscess was observed behind the ear with a swelling along the temple. After applying such things as might promote the suppuration, the abscess was opened the third of September, about eight months after the first attack. Much pus was discharged; the patient was greatly relieved; but, as the suppuration was of great extent, Morand was obliged to make a second incision on the cheek just before the ear, which discharged a great quantity of matter. The second incision healed, the first remaining fistulous, and a sinus was found leading from that opening, upwards, along the temple; still the pains continued varying with the state of the weather.

J. Bell SECTION III. Page 637

CONSISTING OF DISCOURSES,

I. *On* FRACTURES *of the* SCULL, *with Solutions, Historical and Practical, of the important Question, whether Fractures of the Scull be a motive for applying the Trepan?*

II. *Of* DEPRESSIONS *of the* SCULL, *with a Solution of the Question, whether Depression affects the Brain? and whether Depression is any way a more urgent motive for applying the Trepan than simple undepressed Fracture? Accompanied with Examples, Drawings, and Plans of the Various Forms of Depression.*

III. *Of* CONCUSSION *of the* BRAIN *and* EXTRAVASATION *of* BLOOD: *The Signs of Danger, and the Rules for Operating.*

IV. UNIVERSAL RULES *for the conduct of the Surgeon.*

V. *On the* OPERATION *of* TREPAN.

DISCOURSE I.

OF FRACTURES OF THE SCULL.

I will no longer revile the doctrines or inveigh against the practice of the ancients: suffice it to say, that the peculiar nature of their studies begot a passion for operating exceeding all bounds of good sense, propriety, or prudence: The little of anatomy they did know was that of the skeleton, and chiefly of the cranium: they were subtile in the arts of discovering, curious in distinguishing, and inexorable in trepanning fractures: they suffered not the slightest chink or cappillary fissure to escape investigation, and were never contented with what they had done, while they had

"This person having written letters of consultation to Paris, was advised that there might be a caries of the temporal bone, which should be more narrowly looked into; and he accordingly resolved on coming to the capital, where, upon his arrival in April, fourteen months after the first disorder, Morand found a

left any possible thing undone: they scraped and widened every fissure, trepanned every fracture, elevated every depression, were unsparing in their openings, whether made with or without a purpose: wherever blood was extravasated upon the dura mater, they continued to apply the trepan, making repeated openings into the cranium, until they had uncovered the whole coagulum: they scrupled not to apply

caries of the lower part of the temporal bone, wherefore I made an incision (says Mr Morand) to uncover the bone, left it to suppurate, and applied a mercurial solution to keep down the proud flesh: But, the fungus still growing over the bone, I resolved to use the cautery, which, after having applied frequently, procured, on the third day, a considerable exfoliation of the outer table; then I was in hopes, especially when the temporal bone began to cover itself with granulations, that the sore would heal, but it did not, and poured out on the contrary much more matter than the apparent surface of the fistula could any way account for."

"Upon searching again with the probe, I found still a long sinus running up the temple, (says Mr Morand): I felt no naked bone along this sinus: I hoped to heal it by injection: I threw in a little of the balsam of Fiorovanti: I naturally expected some pain; but what was my astonishment, when after suffering excruciating pains, the patient fell into a furious delirium of some duration. Neither irritation of the temporal muscles of the tendinous fibres, nor any external part, could account for such a phaenomenon; I of course concluded that the injection had some how or other reached the membranes of the brain, nor was I deceived; from this upward sinus another ran down towards the pars petrosa of the temporal bone, and by turning my bent probe in various directions, it entered at last a carious hole in the bone, and seemed to penetrate two inches within the scull. Now it was plain why all our former attempts were in vain. Upon consulting with Messrs Le Dran and Guerin, it was resolved, says Mr Morand, to make an incision in the form of the letter T. and to apply the trepan. The incision being made, and the bone laid bare, after suppuration was established, and on the seventh day after the incision, we applied the trepan; but before applying it, I resolved to decide the question, whether the bone was corrupted by an external abscess, or whether matter proceeding from a suppuration of the brain had made its way out through the hole. The latter opinion seemed the less probable, as the patient had been able, during all the disease, to walk abroad and discharge the duties of his ministry. But upon spiggoting up the small round hole on the temporal bone with a wooden plug, the matter, at next dressing, rushed with a whizzing noise through the hole. The trepan was so applied as to comprehend at least one half of this hole; and it happened, that twice after the perforation, I delayed dressing the opening for twenty-four hours, when, upon lifting the compresses, and withdrawing the syndons, the matter spouted out, as it had done before perforation, upon withdrawing the plug. By the fourth or fifth day, the pains began remarkably to decrease; the matter issued in less quantity; my probe passed through a small opening in the dura mater, penetrated a full inch into the brain, and as all along we had only a slight degree of fever to combat, I had sanguine hopes of curing this priest perfectly.

the trepan twelve or even twenty times, but boasted of it as the highest proof of dexterity: they never permitted even the lacerated teguments to reunite with the scull, but exfoliated every naked piece of bone, i. e. scraped it with instruments, or killed it with caustic, not without extreme danger to the brain. This is the rough and cruel surgery of which I plainly accuse them; nor can I entirely acquit the best and foremost of the moderns of like propensities: they also have contributed, by precept and by example, to take away all those decent restraints which should weigh upon the mind of a young man entering into practice: they have

"But I was sensible that in order to accomplish this, it was necessary to dress the ulcer in the brain. I, for this end, introduced a twist of the thickest catgut, held by a small thread, which swelling from dressing to dressing, enlarged the opening in the ulcer of the brain. By the 7th day of this kind of dressing, I could introduce this lint to the depth of two inches; and every time that I withdrew it, there issued from the brain a profusion of pus, which flowed more rapidly when I made the patient cough or retain his breath. This dressing was continued to the 14th day, when I found it necessary to enlarge this opening, by making a crucial incision in the membranes of the brain, opposite to the trepan hole; then I found that I could put my little finger into this cavity, where the substances of the brain seemed reduced to a sort of pulp."

"Next day I began to inject this ulcer with barley decoction, sharpened gradually by the addition of a vulnerary balsam. By the 24th day I found the quality of the matter greatly improved, and its quantity lessened. I increased the proportion of the vulnerary water, adding some drops of spirits of turpentine, and balsam of Fiorovanti; and though the patient felt the injection, he became accustomed to bear it. Upon the 30th, finding the opening, though large, not sufficient for the free discharge of a cup-full of matter, which flowed at each dressing from the wound, I had a silver canula made about the size of a writing quill, and an inch in length. From this time there was no retention of matter, it flowed continually, and was absorbed by the lint: the basin of the ulcer filled up, the direction of the sinus became less oblique, the tube lay almost horizontally; and I promoted these favourable appearances by washing out the ulcer, and by pouring an injection through the canula twice a-day at each dressing: During all this dangerous process the patient was so well as to attend the devotions of the monastery: He wished on the 44th day, a piece of lint to be used in place of the canula, that the matter being retained he might be assured how much of the ulcer remained to be healed. This was done; and the matter was found still to amount to about half a cup full: but, soon after this, the canula began to be fixed by the quick growth of the surrounding flesh; the basin of the sore filled up; and on the 62d day the tube was entirely removed. Finally, this Monk left Paris in the month of December to return to his monastery, where he continued to live in perfect health, and the enjoyment of all his faculties; and so cautious was Morand in the authentication of a fact at once so important and so incredible, that he delayed presenting this report to the French Academy till four years after the cure, which cure had of course been witnessed during all its progress by the most celebrated surgeons, especially by Le Dran and Guerin, who were consulted about the operation."

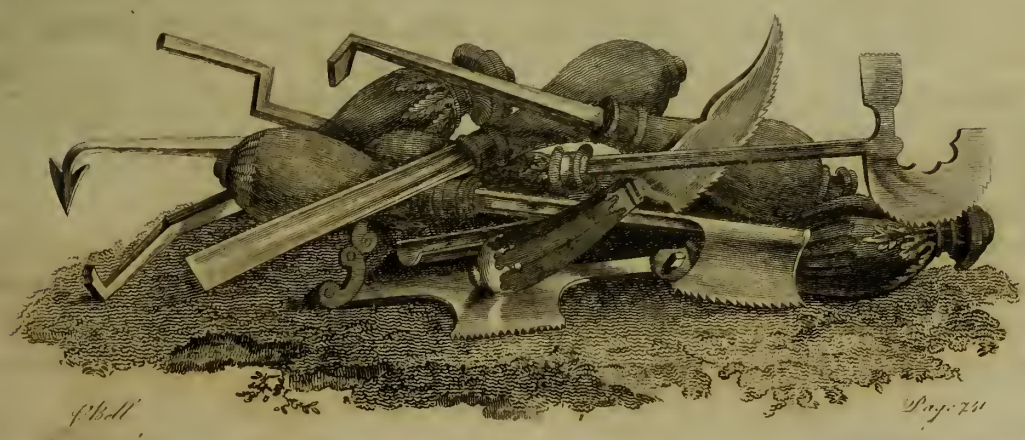
indeed declared roundly that the operation of the trepan itself is harmless! asif it were possible that simple fractures of the skull could be really a cause of danger, while cutting it with saws, making large and wide openings, taking off that resistance which supports the brain, and tearing the vessels which connect the skull with the dura mater could be safe!

It is a propensity so natural with men of our profession to rely on the resources of art, and to mistrust nature, that we seem almost to have forgotten how much unassisted nature can do. It is also an error but too common, to prize highly the learning and maxims which we have acquired difficultly: to carry the speculations of the closet into real practice: to retain the prepossessions imbibed during our younger years, after we are called to those manly duties, which require the exercise of sober judgment and plain good sense. The first great difficulty we feel in acting with a just reliance on our own good sense, is that of believing that any thing usually and openly practised can be entirely wrong; and this again, proceeds from our not knowing from what weak men, or from what trivial occasions, many established opinions and practices have arisen. This once explained, the younger part of the profession would find nothing imposing in antiquity or authority, and would trust to the dictates of that ordinary experience and plain sense which is above all learning. Let us turn then to the works of those amongst the moderns who have studied the ancients, prized their learning and adopted their maxims, and whose artificial practice has corrupted ours; surely it becomes us if not to reform our opinions, at least to enquire into the truth of them, and be able to give a reason for the faith that is in us.

From this case I would infer, that such suppurations affecting the lower surface of the brain are very slow in producing their bad effects; that in such suppurations rough methods are both the most lenient and safest surgery; that in the scull, as in the thorax, there is no safe medium, but every sinus or suppuration, which seems to penetrate to the cavity, must be searched to the bottom; and that no such sinus can, on account of the various crooked directions of the internal sore, be searched thoroughly without being opened. The neglect of this I have seen kill very many who had fistulas on the ribs; and let it be observed, that, in this case of Morand's, 1st, The disease must have been certainly fatal without a proper way being made for the matter. 2dly, That they did not know nor even suspect the danger till, having opened the first upward sinus, they came then to a fistula which ran in quite a contrary direction, downwards, leading to the carious hole in the temporal bone, through which the matter of the abscess of the brain itself was slowly and difficultly discharged, the inward and very dangerous ulcer extending in proportion as the matter was so confined.

It is very remarkable, that, in each succeeding period of our science, some fatal influence or other has conspired to perpetuate that fondness for operations, which I account the greatest fault we can be guilty of, and the most dangerous to our fellow creatures. The rage for operating reigned for many years uncontrouled, and he was esteemed no surgeon who did not search with all due diligence for fissures, who did not exfoliate every naked bone according to the strict rules of art. Thus the number and extent of the openings made with the trepan was the sole test of merit in operating; every depressed bone was poised up or cut out with the trepan: only a few men of natural genius for observation and sterling sense, uncontaminated with learning, ventured to deviate from these rules; cured wounds without exfoliating; looked unconcernedly on fractures without trepaning; left even depressions unreduced, and did no more, when they put their hand to the work, than circumstances strictly required. The cures they often saw atchieved by nature have been regarded merely as exceptions; yet I fear that those natural cures have been but too often anticipated, sometimes prevented by our precipitate operations: and I hope so to recommend those exceptions to your notice as to incline you to consider them in a far more serious light, not as exceptions, but as examples of genuine good practice, and the elements of your reasoning. I shall never divert you from giving every help in fractures or depressions, but I shall attempt to set just limits to that servile adherence to maxims of past ages, and to that boyish, busy, meddling disposition which I have too often witnessed. The numerous inventions of chizzels, saws, scraping irons, and tools of various forms for cutting the scull, are a sad monument of the vicious practices of past ages. The instruments I represent in this marginal plate are now fallen into disuse, but the prejudices of those times have not disappeared.

Saws. Rugines & pointed Instruments of various forms for scraping and widening Fissures & fractures.



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In the later and better times of surgery, when, in the great hospitals, every surgeon of eminence practised under the public eye, and was answerable to the profession for his doings; when from the study of anatomy, the decline of false learning, the gradual accumulation of knowledge, and the improvement in real and practical skill, plain sense came to be valued, rules, such as had been transmitted by the ancients, could not continue to hold any influence over the public mind. But at this auspicious period, those very institutions which promised fairly and were fairly designed for the improvement of observation and pathological enquiry, actually revived and strengthened the passion for operating. A society of men was convened in France, by the most ostentatious of all their monarchs, who seem to have been intent on discovering nothing but wonders! wonders of art and wonders of nature! "Who discovered and proved to the *young surgeon*, that he may freely open *Abscess* of the brain, search into its very *substance* for *foreign* bodies suspected to be buried in this viscus: *cut off portions of it* when tainted with gangrene, and *amputate carious or fungous tumours* arising from its substance." "Nor should it be forgotten, (say the member of the Royal Academy,) that we have proved, in a former essay, how well and safely openings may be made with the trepan to allow of these various operations.*" What good such essays may do it will be difficult to say; the danger of *proving* any such matters is very plain: better by far leave such unprecedented operations to be done only from the urgency of desperate circumstances, than make them seem light and trivial by this familiar enumeration of contingencies, which I would almost pronounce imaginary, which, in the outset of life, and in the moment of reading such papers, occupy greatly the mind of the young surgeon, who yet grows old in practice, wondering that he has seen nothing of those *Abscesses* requiring puncture, nor of those *Gangrenes* and *Cancers* of the brain.

There has ever appeared to me something reprehensible in the works of the French academy, so that I should shrink from the thoughts of putting these

* Certaines operations, que le danger, dans lequel se trouve le malade, permet, et que les indications prescrivent, comme l'unique secours que l'on puisse employer; qu'ils peuvent, par exemple, ouvrir des abcès dans la substance du cerveau, rechercher, lorsque les accidens le demandent, des corps étrangers que l'on croit retenus dans ce viscére, retrancher des portions de la substance du cerveau lorsqu'elle est atteinte de mortification, emporter des fungus et des tumeurs carinomateuses auxquelles le cerveau est sujet. On doit se rappeller ici le précis d'observations que nous avons rapportées sur la multiplicité de trépans, afin de remarquer qu'on peut faire au crâne les ouvertures nécessaires pour pratiquer facilement ces opérations.

volumes into the hands of the young surgeon: throughout these papers, the academicians talk of numerous perforations with the trepan! of sawing out large pieces of the skull! of puncturing the dura mater as freely with the lancet as you would puncture a vein! of shaving off the protrusions too apt to take place after such incautious openings of the skull! of the wasting of vast quantities of the brain by abscess, and of safely amputating part of its substance with the knife, in a tone of familiarity neither right nor becoming, and requiring the strong antidote of facts and reasoning, and authority, as there is much authority against such doings: The authority of men who in the ages less tolerant, and less enlightened, had the sense and courage to oppose similar doctrines, and refrain, even when the occasion and temptation were fair, of acquiring reputation without blame.

" The young surgeon, seduced by such precepts, tempted with a likely occasion of acquiring fame, and fortified by the authority of a whole academy of surgeons, convened for the purpose of ascertaining the principles of our art, may rush into these desperate enterprises; we should therefore guard him against such misconduct, by instilling early into his mind just principles and modest thoughts." This is what I should naturally say. Mr Quesnoy says much the reverse; " Surgeons, for fear of their reputation, have ever chosen to leave their patients to perish rather than to make such attempts: though, perhaps, our fears in respect to punctures of the brain may be ranked with those of the ancients about puncturing the dura mater.*" I would not for a dukedom charge my conscience with the faults which suggestions like these may occasion; and cannot but wonder at finding Mr Quesnoy expressing no apprehension but about the import of the signs which mark such abscess, and no regret but that " the abscesses of the brain are not always advantageously placed for the use of the lancet," and that sometimes this kind of injury presents itself like a counter-fissure in the part of the scull least suspected, and opposite to that injured. " We may then, (says Mr Quesnoy) where the palsy is accompanied with particular signs of danger, trepan on the side of the head opposite to the palsy; and should we find nothing wrong, neither under the scull

* Dans la crainte de trop exposer leur réputation, les chirurgiens ont mieux aimé laisser périr le blessé que de faire une telle tentative; cependant notre crainte d'ouvrir le cerveau peut être comparée à celle que les anciens avoient d'ouvrir la dure-mere: aujourd'hui l'on n'hésite plus à ouvrir cette membrane, et cette opération a sauvé la vie à une infinité de blessés. Peut-être que les praticiens qui nous suivront seront surpris *aussi de notre timidité à ouvrir la substance du cerveau:* nous avons déja beaucoup de faits qui nous reprochent cette timidité, *et qui nous excitent puissamment à risquer dans les cas désespérés l'opération que nous proposons.*

nor under the membranes, venture a few slight incisions into the substance of the brain." Could it be believed, that any man could make the insensibility of the brain (though proved and acknowledged) an argument for plunging the lancet, upon every suspicion of abscess, into its substance, or work himself up to such a fervor, or rather phrenzy, as to speak thus familiarly of a few slight incisions into the substance of the brain? It is in the next paragraph that Mr Quesnoy speaks of the insensible nature of the brain *; but the paragraph is so audacious, that, in place of translating it in my text, I transcribe it on my margin; there let it stand, like a beacon on a foreign shore.

Next arose Mr Pott, a surgeon of unrivalled excellence, whose influence was fairly acquired. But let those who have influence with their profession use it discreetly and wisely: let them ponder well the maxims they announce: for Pott fell into a system of practice so bloody and enterprising, that, in the few years which have elapsed from his death, it has fallen into utter discredit, and he delivered his maxims in a stile so decisive and imperative as to impose even now upon the younger part of the profession, while, by all who judge for themselves, his practice is abandoned †: no wonder it is abandoned, being, in every point, except one ‡, repugnant to good principles. He, in every case, whether slight or dangerous, *cuts off the whole puffy tumour*, scalping the part with a circular incision §: he,

* *Et si on ne découvre rien sous le crâne ni sous les membranes du cerveau, on peut hazarder quelques petites incisions dans la substance même de ce viscère. Pour s'assurer s'il n'y a point dans la substance corticale, et même au-delà, quelqu'abscès qui soit la cause de ces accidens, une telle incision n'est point à redouter pour la vie du malade; car si l'incision rencontre l'abscès, elle peut sauver la vie; ET SI ELLE NE L'ATTEINT PAS, CET ABSCES FERA PERIR LE MALADE INDEPENDAMENT DE L'INCISION; ELLE N'EST PAS A REDOUTER NON PLUS PAR RAPPORT A LA DOULEUR, CAR ON A SOUVENT OBSERVE QUE LA PROPRE SUBSTANCE DU CERVEAU EST INSENSIBLE.*

† In the accounts which we have of the former practice in France, it is related that surgeons made numerous perforations along the whole track of a fracture of the cranium; and, as far as I am able to judge, without any very clear design. Mr Pott also advises such an operation, with a view to prevent the inflammation and suppuration of the dura mater, which he so much apprehended. But many cases have occurred of late, where, even in fractures with depression, the patients have done well without an operation. *Abernethy's Essays.*

‡ Vide page 495 of this volume.

§ It is no extenuation to say that Sharp did so before him; past and present authorities declare it to be murderous practice.

in every suppuration of the dura mater, and in every case of extravasated blood, *applies the largest trepan*, though he has no other purpose than to give vent to such matter or blood: Dissatisfied (as he had reason to be) with the small trepans in common use, he ordered them to be forged for him of an unusual size, and did not spare their liberal application. After perforating the scull once, in place of providing by other means for the free evacuation of the matter, he applied his trepan again and again, till all the suppurated surface of the dura mater was displayed, declaring it to be his intention to cut away all that part of the scull, however extensive, under which the suppuration existed *.

" When the operation, says Mr Pott, has been performed, not as a preventative, but to give discharge to matter, the only chance of relief is from laying bare a large portion of the dura mater, that the discharge may be as free, and the confinement as little as possible, as nothing but this can do good.†" And again he says, " Yet perforation is absolutely necessary, in seven cases out of ten of *simple undepressed fracture* of the scull." He does by no means deliver these rules with temperance or modesty, but says, " I am as well satisfied of this as of any truth which repeated *Experience* may have taught me ‡."

Such bold words lose all power when we begin to find how ill experience may teach a man, and how unreflectingly such language is used. At first, the reader would naturally say within himself, " Surely Mr Pott, before he could use such confident language, must have seen repeated and afflicting proofs of the necessity of using the trepan:" but to his utter confusion, he finds the very words repeated in commending the now absolete operation of scalping, and, indeed, on every occasion, trivial or important, for it is with this author, a manner, and no more: He says, § " The way of doing this, (viz. of scalping) has formerly been the occasion of much difference of opinion; but THERE CAN BE NO DOUBT *about the greater propriety* of removing a piece of scalp for this purpose, *by an incision in a circular form* !" Even when Mr Pott applied the trepan, not on account of any present, but of some eventual, perhaps imaginary danger, he set no limits to the number of perforations, but the extent of the fracture: He says, ‖ " If the trepan be applied in a preventative sense mere-

" Et ex sloicis quidam medici sunt qui amputant Angulos vulneris et projiciunt; et est illa intentio in qua non est nisi fatuitas." *Brunius Chirurgia Magna, lib.* 1. *cap.* 17.

* Vide page 138. † Vide page 178. ‡ Page 145.
§ Page 169. ‖ Page 177.

ly, *the length of the fracture must determine the number!* one or two only may be made at first." In short, all his precepts, most of his cases, and even the very form and size of his instruments, contributed to renew and strengthen that passion for frequent perforations and large openings of the cranium, which the decline of false learning and the progress of plain good sense had almost allayed: and I will venture to say, that whoever has studied his writings, or imbibed his principles, must imagine that, in the work of trepanning, he can never do too much, and is only blameable where he has left any possible thing undone.

Unfortunately this passion for leaving nothing imperfect in a difficult and dangerous operation, nothing that might endanger the surgeons reputation or his patient's safety, is not a learned maxim, but a most natural propensity, one which has prevailed in all ages, requires all our discretion, and should be kept under due restraint. That every the slightest depression should be trepanned, is a notion which gradually and insensibly insinuates itself into the mind of the young surgeon, who says within himself, "If soft and fluid blood oppress the brain so dangerously as to require perforation of the scull, how much more deep and deadly must that oppression be which proceeds from a hard and firm bone depressed and driven inwards upon the brain, and so immoveably fixed that it cannot be raised: surely it should be cut out with the trepan? "If the trepan be at all useful, to be entirely so, the operation must surely be compleat? If there be danger from depression of the scull, or from blood or matter being confined under it, surely every depression, even the slightest, should be raised, nor must large openings be spared, seeing they are necessary to give free vent to the matter or blood?"

This, I believe, is but giving words to a prejudice, which, though not avowed, is yet universally felt: such prejudice arises from inexperience and fear: nothing indeed but fear and ignorance could make a man think it his duty to raise every slight depression, or believe it a fatal error to leave the slightest imperfection in that part of the work. The passion for raising depressed bone, for obliterating even those slight dimples, of which the sculls of children are so susceptible, gave occasion to the most puerile and ludicrous inventions: the project of discovering fractures by making the patient crack walnuts, or hold a wire in his teeth, are not more ludicrous: and we feel mortified to observe even the sagacious and sober Hildanus occupied as fervently as the greatest fool among those inventors, in laying down various rules and methods for elevating depression in

boys, or in men, according to their various ages. To prove that we never should be at a loss for instruments to perform so laudable a work with, he relates the case of a country fellow, who, being wounded in the head with a halbert, fell down as if dead: a surgeon of respectable skill being called to his assistance, found him seemingly apoplectic, and liker death than life: having no elevator nor any suitable instruments at hand, he procured a carpenter's gimblet, screwed it into the chink betwixt the two fractured bones, raised them to the level by the hold it gave him, and extracted several splinters of bone *."

It had been well if Hildanus had confined himself to the eulogium of a resource, in some degree sensible and necessary. Wurtzius desires all such dinges and impressions to be left alone: saying, "Circa impressum cranium non multum laborandum:" how much, on the contrary, Hildanus toiled in this occupation, you may judge from this, that he invented various plasters, which, being laid upon the head of the child with a string in the center, operated like a boy's sucker fastened to a stone: by pulling the string, you raised the depression: and Hildanus adds this special direction, that, in place of altogether shaving the hair, you should only cut it close, that the plaster might stick to the roots! Next, he invented a sucking-horn, which he has very carefully delineated, which, being applied like a cupping-glass, and sucked by a man of strong breath, raised the depression! and, finally, he directed that the child should strain its own breath, or that if it would not or could not do so, you should close its mouth and nostrils, and hold in its breath, to assist the external suction. Thus did he suck out the dinges and depressions from the sculls of boys; but to maintain the bone on its due level, after being thus raised, he fell upon a more profound invention, more applicable to depressions in men, whose bones are firm: "A depression of the scull, though elevated to the level, is, according to Hildanus, apt to fall down again;" to prevent this, he invented a shorter screw with two holes in it, and fixing this screw in the depressed portion, he pulled it up, and put a pin through one of the holes in the screw, to prevent its falling down again, and there left it: "And mind," says Hildanus, "to have a file at hand to file off the

* Hildanus himself assisted at this operation, and assigns his reason for transcribing it as a precedent. "Haec propterea adscribo, ne fidelis ac diligens chirurgus aegrum periclitantem, propter penuriam instrumentorum relinquat."—p. 83.

end of this cross bar if it should prove incommodiously long *. The marginal plate at the head of this chapter is the cucurbitulum of Solingen, (says Purmannus) designed to raise the scull up again, that by some ill accident hath been depressed: it ought to be made of pewter, and proportioned to the dimensions of the wound: it has a piece of leather about the neck, and a leather strap through the two ears, to raise the cucurbitulum with, after it hath been placed upon the depressed scull, with a large flame."

These are the mechanics of fractured scull, as enteroraphy or the sewing of wounded intestines is of hernia: closet speculations, inapplicable and unprofitable †. Even the necessary, simple, and useful instrument, the lever, for raising depressions and picking out bones, has been so praised by Petit, in his paper to the French Academy, as to make it appear as if the raising of depressions were the whole scope and purpose of the operation of trepan; and such a spirit of enterprise has arisen, that one surgeon ‡ boasts of having laboured to raise a depression, much against the sober precept of Wurtzius, (non multum laborandum) with two strong able bodied surgeons, and four levers, applied all at once, under the depressed bone, with a proportioned exertion, no doubt, to keep the head of this unfortunate person firm upon the table! What an absurd and ludicrous idea of the modern art of surgery must this convey?

* It was indeed very long before they would venture to believe or publicly affirm, that a depression once elevated would keep its level. Witness the following passage in Berengarius: "Admiraberis lector quia dixi magnum ossis frustrum esse elevatum, quod erat depressum, et ad situm naturalem reductum, et ibi remansisse; sed est verum, et pluries hoc contingit ut magnum ossis frustum in fractura cranii, vel incisione à re gravi non subtiliter incidente, plicetur, et inferius notabiliter descendat, quod indiget elevatione, et elevatur, et *stat in loco suo ut prius.*

† "Such depressions, (says Hildanus) though not immediately followed by dangerous symptoms, make the boys very heavy and stupid, and very subject to rheums in the head; besides such depressions are often relieved merely by applying a cupping-glass, as recommended by that celebrated surgeon Paraeus: or rather, apply the sucking-horn which I have given a drawing of; let a strong breathed man suck, while you hold the mouth and nostrils of the child!"—*p.* 83. *Hildan. Opera.*

N. B. when the depression is to be raised by the plaster, composed of pitch, rosin, gum elemi, &c. an operation of which I have, on the next page, given a drawing from Hildanus, still the mouth and nostrils of the child are to be closed. "Interim autem, dum chirurgus emplastrum aufert, os et nares infantis, ut antea quoq; monuimus, claudendae sunt. Sic inflato cerebro propter retentionem in ipso spirituum, cranium impressum facilius in situm naturalem relevabitur.

‡ Vide O' Halloran's Cases.

With the best and soberest surgeons, this passion for raising depressions has been so universal, that, in the younger members of the profession, it is pardonable. They are impressed, during the whole course of their education, by all the expressions used in books, by the narratives of cases, by the very form of our instruments, and especially by the multiplied inventions of screws and levers, with this belief, that no motive for applying the trepan is so legitimate, none so fully authorises the largest openings, and every kind of violence, as the hope of raising a depression of the scull. I question whether many of you have imagined any other reason, or heard another motive assigned for using the trepan; which yet is so far from being the just one, that I pledge myself to prove to you, that no judicious or skilful surgeon will give himself the slightest pain to think about a mere depression, unaccompanied, as it often is, with bad symptoms. Indeed I have here much reason to advise you how to read and what to imitate: I shall proceed, with no supercilious humour, but in truth and soberness, to question many received axioms, and reverse some rules of practice: you will decide for yourselves at some future period, when time shall have abated your enthusiasm and improved your judgment, whether I have done well in advising you against this passion for operating, or have taught you the right manner of reading books and construing facts.

Having marked out, as worthy of your particular observation, certain points, in which sense and learning will ever be at variance, I proceed to teach you a sober and modest line of practice. I could have no pleasure in frequent allusions to past errors, unless they had an immediate relation to modern practice. Enterprising operations are in vogue, chiefly because such doings are spoken of with commendation, and recorded among the wonders of surgery. While the old surgeons allowed not the slightest chink, fissure, or rima, as they called it, to escape investigation; the slightest fissure, or the bare suspicion of one, was the signal for applying the trepan, and there was nothing so gratifying to them as a fracture so circumstanced, or an extravasation so extensive as to require, or at least to vindicate, the application of the trepan ten or twelve times. It was not that the crown of their instrument was small, and thence its application, necessarily frequent, to make even a moderate opening; they scrupled not, after making numerous perforations, to cut up all the intermediate pieces of bone with the saw, and clear away a whole parietal bone, or half the scull. This was the pomp and pride of surgery in former times, which you are called upon to imitate, by the approbation with which such facts are now commemorated, and by the very form of instruments put into your hands, which are by no means calculated to make very moderate openings: the making very large openings, either by large trepans or frequent perforations, is a practice highly commended in every book, and the extent of the fracture is usually reckoned the sole limits of the opening.

" In extensive fractures [says Dionis] we should not hesitate to make two, three, or four perforations, if required. A young girl, of eleven or twelve years of age, having, by a fall down stairs, fractured the whole of the parietal with a part of the temporal bone, Mr Marechal trepanned her next day in two places: he made his son trepan her a third time; he allowed my son, who was present, to trepan her a fourth time: he next day, applied the trepan twice more, and in the end had actually perforated twelve times, and cured her completely. So precious an example shows how little reason we have to be surprised at the frequent application of the trepan*." Here is a doctrine laid down which,

* " Lorsqu'il y a grands fracas et plusieurs fentes, on doit faire deux, trois ou quatre trépans, et même davantage, si la nécessité le demande. Une jeune fille âgée d'onze ou douze ans, tomba sur un escalier en 1705. et se brisa tout un parietal avec une partie du temporal. M. Maréchal dès le lendemain la trépana en deux endroits, il lui fit appliquer un troisiéme trépan par son fils, et un quatriéme par mon fils qui étoit présent. Le lendemain il lui en appliqua deux autres, et par la

I fear, there is little occasion to enforce; and I cannot but persist in being surprised and shocked, at the frequent and large perforations which I have both read of and seen, and cannot but think of these veterans in surgery in no very amiable light, when I see them indulging their boys in the novelty of operating, probably on very slight compulsion.

These reports, and especially the last clause of this paragraph, viz. "that we should not be surprised at the number of trepans," have plainly a reference to the ever memorable operation performed in the time of King William's wars on Philip Count of Nassau, by Henry Chadborn chirurgeon. Godifredus, chief surgeon to the States of Holland, mentions with particular exultation this operation performed by his friend, who trepanned the cranium of the Count of Nassau twenty-seven times, and ascertained the fact by the most indisputable authority, for he made the said Duke of Nassau, after he was recovered, on the 12th day of August 1664, write the following curious certificate. 'I the under written Philip Count Nassau, hereby declare and testify that Mr Henry Chadborn did trepan me in the scull twenty-seven times, and after that did cure me well and soundly."

Twenty-seven crowns of the trepan of the most moderate size, applied to the human scull, must, as I should guess, cover the whole, and there could be little occasion to chizzel out the intermediate pieces; but there is one celebrated author of the present age, who can tell us expressly and accurately, it is Mr Lassus of the school of health, professor of surgery, whose book on surgical operations is published in the third year of the *Republic one and indivisible.* Would you believe it! This gentleman is at pains to gauge the scull in order to bring the matter to a geometrical certainty, and ascertain beyond dispute how many crowns of the trepan may be applied to the scull. "There is no part of the cranium (says Lassus,) inaccessible, except its base; though the bumpy part of the occipital bone should be avoided on account of its

suite il la trépana jusqu'à douze fois, et elle en est très-bien guérie. C'est la fille de M. le Vasseur logé à l'Extraordinaire des Guerres à Versailles. *Cet exemple si rare* fait voir qu'il ne faut point s'étonner sur la multitude des trépans —*Dionis, p.* 522.

This "rare," or precious example, all the parties were so proud of, that Mr Marechal afterwards, in the memoirs of the academy, adds circumstances which tend but to make the proceeding more extravagant, and increase our wonder at the child escaping alive, for he had left but a line betwixt each of these twelve trepan holes, and with his leveller tore them all up, so as to convert all the perforations into one great opening. "M. Maréchall avoit laissé entre les trepans environ un ligne d'interval qu'il fit sauter avec l'elevatoir, pour ne faire qu'une ouverture de tous ces trepans."

thickness, and the lower corner of the parietal bone, on account of the spinous artery which is imbedded in it. Upon marking the scull with the head of the trepan, avoiding all the sutures and the lower part of the occipital, and scaly part of the temporal bones, it will be found *possible* to apply the *Trepan forty times, or more*, on the human scull. This lessens our astonishment at the operation quoted from Vender Wiel, performed on a gentleman of the house of Nassau."*

Still, like his countryman Dionis, Lassus seems pleased with this vindication of the courage and enterprise shown by the said Henry Chadborn, and seems animated with the hopes of such surprising things revolving again in his own lifetime. This report of the square superfices of the human scull, though it may be very flattering to those who indulge this passion for operating, is by no means wise or prudent when addressed in an elementary book to young and inexperienced men; and you must be conscious that while examples and arguments of this tendency are put before his pupils, in every book of surgery, a teacher has a duty to perform before entering on the direct principles of no unimportant nature. I am not only excusable in holding such practice in contempt; I am called on to repress it. Only a few men of strong natural sense, among whom Platner is one, have had the sense and courage to protest against such doings. "There is by no means any necessity (says Platner,) to have recourse, in all cases of fissure or fracture of the scull, to instruments to cut them out with: where there are no evil signs, the trepan is not required:† but unhappily the most extravagant and foolish things are best remembered, and oftenest repeated, while these solid remarks of a man of skill and judgment are but too easily forgotten.

We find that it had been the practice of the older surgeons not only to apply their trepans the whole length of a longitudinal fracture, but along each of the radii of a star-like fracture, and in short, to repeat the expression of Platner, 'to cut it out.' The testimonies of the most sensible writers are against the operation,

* "Si l'on veut se donner la peine d'appliquer sur le crâne d'un squelette autant de couronnes de "trépan qu'il est possible d'en appliquer, en évitant même toutes les sutures, la partie écailleuse du "temporal et la partie inférieure de l'occipital, on trouvera qu'il est possible d'appliquer au moins "quarante couronnes de trépan sur une tête humaine. Cela rend moins étonnante l'observation rap-"portée ci-dessus d'après Vanderviel, relativement à un homme de la maison de Nassau qui fut "trépané vingtsept fois."

† Nam necesse non est, ut in omni fissu fracture Calvaria ad ferramenta veniamus quibus illa excidi solet, "quod si enim nulla mala sunt indicia modioli usus supervacuus est." § 552.

and most unfavourable to the men who have indulged it, for it has been ascribed not to reason but to pride. " If the opening (says Wiseman,) in the fractured scull be not sufficient, make one in the most declining part, and raise up the bones, and free the membrane of whatever may offend it, but *do not* take *out any more bone than needs must*, like some of those surgeons I have met carrying them about in their pockets, BOASTING IN THAT WHICH WAS THEIR SHAME." Never is the apology wanting to those who are proud of making numerous preforations : if they do not find a conspicuous depression, or a great length of fracture, they affect to be seeking for pus, or that they are anxious to let out extravasated blood. They dare not forsooth, after making the necessary opening, allow the pus to ooze out gradually, or the blood to melt down and be resolved into serum. They affirm, " that it is infinitely more dangerous to wait the dissolution of the coagulated blood than to make numerous perforations for the evacuation of such pernicious juices, for not only such openings as that we have just mentioned of 12 trepans, but openings much more extensive, close easily."* " I have seen surgeons, says Ravaton, so infatuated, so desperately bent on discovering abscess on the dura mater, that, after applying six crowns of the trepan, they would, I verily believe, have pulled away all the remaining bones of the cranium, had not their patients been delivered by death from such operations."† In short, their doctrines and practice outraged common sense : every thing was to be done by the surgeon, nothing left to nature : every depression was to be elevated ; the whole matter to be evacuated ; the whole extent of the extravasation to be covered by trepan holes, and the limbs and whole extent of a radiated fracture were

* Il y a beaucoup moins de danger pour le malade de multiplier les trépans pour évacuer ces sucs épanchés devenus pernicieux, *que d'atteindre une plus grande dissolution qui augmenteroit le perilē ; car non-seulement les grandes ouvertures du crâne, telles que celles des douze trépans dont nous avons parlé, mais encore de beaucoup plus grandes, se ferment facilement.—Quesnoy, page* 258.

† A combien des chirurgiens qui sont d'ailleurs fort habiles, mais qui ignorent ces connoissances ; n'est il pas arrivé de se meprendre, et d'appliquer le trepan trop tard ou sans necessité ; J'en ai vû de si obstinés a chercher un depôt, qu'apres avoir appliqué six couronnes sans rien recontrer, *ils eussent, je crois, enlevé le resté des os du crâne, si la mort ne leur avoit enlevé leur patient.*

Mais quand le depôt qu'ils cherchoient auroit été recontré et enlevé, comme s'il n'y en avoit jamais eu ; la raison et l'experience de tous les tems, ne montrent elles pas, que la multiplicite de ces sortes de playes doit etre mortelle, que la regeneration de la peau que vous coupez ne peut jamais se faire. Je passe sous silence le premieres accidens, qu'occasionent toujours la lezion du pericrâne ; les os mis a nud, bien ruginès, &c.

to be cut away. There were no limits assigned for these openings, but the extent of the extravasation or fracture, and they were well contented to find that 40 crowns of the trepan might upon necessity be applied to the human scull!

But there is a scene of practice very different from this, where men, engaged in the actual duties of the profession, in peace or in war, in cities or in the field, learn to look coolly on wounds of every description, and know from experience what nature will do, and how impertinent and vain those operations are. It often happens to grooms or farriers, trimming horses feet with too little precaution, that the horse striking out, they receive the kick full in the forehead: the scalp is torn up, the scull manifestly injured or not a little depressed; these men live a coarse irregular life, and yet such fractures heal easily, but, were the trepan applied on every such occasion, we should have many dismal scenes. It often happens that boys playing with horses, plucking hairs from a colts tail, for example, are knocked down by a kick in the forehead; often the bone is deeply depressed, very often the marks of the heels or caukers of the shoe are impressed upon the os frontis; sometimes a piece of the bone is actually turned upwards along with the scalp; but the scalp being reapplied to the scull, the splinters of the bone picked away, and the ragged integuments smoothed and secured with stitches, the boy, without one hour of sickness, recovers as if his wound were only of the skin. But were such pieces of depressed or shattered bone cut out; were openings made at all proportioned to the depressions or to the extent of the fractures; were the delicate dura mater of a boy left exposed to that force of circulation, which dilates the brain, and fretted by every stroke of the arteries against the margins of the opening, the dura mater would slough, the brain protrude and suppurate, and the boy expire howling and convulsed: Examples of such imprudence and such consequence I shall presently relate, for I know, that when my business is to impress you with any practical truth, the best way of confirming the maxim and making you feel the force of it, is plainly to represent the scene.

Often the recovery where the scull is very deeply wound, is so rapid, as to surprise those even who are the most resolute in refraining from the use of the trepan, and the best prepared to expect a happy issue. The faith and credit of Parus stands unimpeached; and the case he relates, of a cure performed with his own hand, is the most remarkable of any yet recorded; since even the segment of the scull isself in a clean

sabre-wound, adhered again in common with the wounded scalp. "I advise (says Pareus) wherever there remains a portion of the skin still connected with the wounded scalp, that neither that skin, nor the divided portion of bone be cut away, but the bone sewed up along with the skin: What Celsus commends, (says Pareus) I performed in the case of Captain Hydron, who was a short while ago wounded in this city with a sword through the center of the os frontis, the bone being cut down the length of three inches, so that it hung over his face, connected with the scull only by its pericranium, and about three inches of the fleshy scalp. At first sight, I questioned whether or not I should complete the separation of this piece of skin with its adhering bone, but remembering Hippocrates's maxim never to uncover the brain, I cleansed the blood, which was upon the dura mater, laid up the separated piece, and, for the better retension thereof, made three points of the needle in the upper part, and put in three small dossils in the sides of the wound, the whole being so nicely replaced, that, by God's grace, it healed perfectly, though the gentleman was otherwise much wounded on the face, in the thigh, and in the right breast. I finally beseech you (says Pareus) never to amputate neither skin nor bone, lest the brain should be left bare *."

In the work of Berengarius, De Fracturis Cranii, so much and justly praised, you have no instructions for discovering, nor any warrant for trepanning fissures.

* Or il faut icy noter, que s'il aduient qu'il y ait grande playe apres auoir coupé du tout l'os, et que portion du cuir musculeux fust demeurée sans estre entierement coupée: en tel cas ne faut paracheuer de couper ledit cuir, ny separer l'os (qui sera du tout coupé) d'auec le Pericrane, mais reduire lesdits os et cuir ensemble en leur lieu. Ce que Celse commande, et feis au Capitaine Hydron, lequel puis peu de temps fut blessé en ceste ville d'vn coup d'espée au milieu de l'os Coronal. Et estoit ledit os coupé du tout iusques à la dure-mere, de grandeur et largeur de trois doigts ou enuiron, tellement qu'il se renuersoit sur le visage, et ne tenoit plus qu'au Pericrane et cuir musculeux, enuiron trois doigts et promptement voyant icelle playe, fus quasi d'opinion de parachever du tout le couper: mais ie consideray qu'Hippocrate et les autres bons praticiens ont tousiours prohibé de ne laisser le cerueau descouuert, s'il est possible: puis i'essuiay le sang qui estoit tombé sur la dure-mere, laquelle on voyoit mouuoir al'oeil; puis réuersay la piece qui estoit separée, la posant en son lieu: et pour la mieux retenir, feis trois point d'aiguille aux parties superieures, et mis de petites tentes aux costez de la playe, afin de donner issuë à la sanie. Et le tout fut si bien adapté, que par la grace de Dieu il en guarit; jaçoit qu'il eust encor plusieurs grands coups d'espée, tant au trauers d'vne cuisse, qu'au visage, et vn autre au costé droit pres la mammelle, passant le long des costes, penetrant outre de l'autre part en la partie basse de l'Omoplate. Et pour conclurre, ne faut faire amputation de l'os ny cuir musculeux qui ouure le Crane, et moins encores des os d'iceluy, sinon le moins qu'il sera possible, de peur que le cerueau ne soit descouuert.

He seems to have been taught a very different practice by his father in his earliest years. They seem, in these times, always to have felt a sort of trepidation when they sewed the scalp; and Berengarius gives many anxious directions about undoing the stitches upon the slightest appearance of fever or abscess *; but still he directs that the scalp be sewed.

Especially when the bone was wounded, they feared to sew the integuments; yet Berengarius, while he complies with the rule, relates an exception highly worthy of notice. He reminds his reader that he had advised the suture of the scalp only when the bone was unhurt and the pericranium entire; "for a suture (says Berengarius) being drawn close over a diseased bone, the patient dies, wherefore, such wound must be dilated and opened, not sewed and closed: Yet, I call God to witness the truth of the following narrative, so unprecedented that I dare hardly tell what I saw. While I was a young man, a soldier wounded his fellow with a weapon, and cut down the os frontis from its upper part to the superciliary ridge, so that the os frontis, with its integuments, hung over his eyes, divided from above and at the sides, and connected only below. My father went first to his assistance; and removed the bone from the integuments; the bone was the whole length of the os frontis; the dura mater was untouched. The skin of the forehead was replaced and stitched without that opening at the lower part of the wound which surgeons are accustomed to leave as a drain for the matter; being closed with white of eggs, and dressed daily, it was in ten days compleatly reunited, and ever after the systole and diastole of the arteries was distinctly seen where the bone was wanting †. This I have put

* Debet etiam esse intentus ad accidentia, puta an superveniat febris, vel apostematur locus, vel retineatur sanies, et illis visis removeat puncta statim et res bene succedat." "Suatur ergo si sutura indiget, &c.—*Page* 121.

† Nota tamen lector, quòd dixerim suturam fieri debere ubi os non fuerit laesum aut pericranium: quia, si in tali casu fieret sutura, stante osse laeso esset mortis causa: debemus enim detegere et aperire, non autem claudere et suere vulnera. Deum tamen testor, me vidisse unum casum quem narrare vix audeo ob magnitudinem. Dum essem juvenis accidit Carpi ut quidam Bernardinus Spacinus vulneraret Bernardinum Vicentinum (ambo autem erant milites Illustris Domini Marci Pij de Carpo) telo vulgo dicto roncha, et totaliter os frontis à superiori ad inferius usque ad supercilia separaret, ita ut cranium esset annexum cum cute frontis, cutis tâmen circa supercilia non esset separata totaliter, sed incisa in superiori parte tantùm et à lateribus. Et ita os et cutis frontis cooperiebant oculos patientis. Ad hunc vulneratum accessit genitor meus, et statim amovit os à cute frontis: et os illud erat latum et longum sicut tota frons et dura mater non erat in aliqua parte laesa. Est statim amoto osse suit cutem frontis in loco suo, sine aliquo spiramine, et apposuit albumina ovi cum stuppa.

down, says Berengarius, to make medical men keen and courageous in curing wounds."

Besides these instances in domestic life, it is remarked, to the dishonour of our trade, that in times of war and trouble, when men are not allowed to take care of their wounds, those who are least cared for are soonest cured; and a man, who is forced to wrap a clout about his head and ride for his life, is safer than one who is chambered up, dieted, and dressed, perhaps trepanned by the surgeon. The great rebellion was full of such adventures and hair-breadth escapes, many of which are related by Wiseman: among others, that of "a gentleman who, a day or two before the battle of Worcester, attending the Earl of Derby in his retreat thither, received a large wound between the sagittal and coronal sutures by a sword, which went through the cranium to the dura mater, is exceedingly remarkable: the membrane was covered with small shivers of bones: he had only a thin linen cap over it, his haste not permitting him to be dressed, and it may be it was the better for him, for if dossils had been hastily crowded upon the bones, severe symptoms would have followed; whereas the shivers lying lightly upon the membrane, he was free; and being ignorant of his danger, rid a great journey: I after took them out, and dressed the membrane with digestives, the short time we were together." It was upon such proofs that Wiseman came to be persuaded of this general truth, that "RECENT FRACTURES OF THE CRANIUM DO FREQUENTLY UNITE LIKE THOSE IN OTHER PARTS, if the matter hath liberty to discharge from within. Therefore having raised up the bones that are loose, dress the others dry *."

You will not easily find a more dramatic representation of such a wound, nor a more artless narrative of a cure, than that of the soldier wounded at the fight at Worcester. "At the battle of Worcester, a soldier came to us where we were dressing, with his sword in his hand, the blade broken off near the hilt, with many wounds on his head. I, seeing the hairy scalp of one side of his head hanging down his

In secunda visitatione applicuit meum cerotum quod humanum appellatur, à me inferius describendum, et consequenter simul in die mutabat cerotum; et in decem diebus hic fuit senatus, tanquam si fuisset vulnus simplex. (Certè apparent interdum miracula in natura) et iste vixit longo tempore, et semper apparuit motus diastoles et systoles in loco in quo deficiebat os.

Haec dixi ut faciam medicos animosos in curandis aegris, quia ipsis interdum magna contingunt, sivè haec accidant à medico sive ab aegro propter aliquam siderum qualitatem, vel aliundè.

* Wiseman, page 113. vol. ii.

neck, went to him; and calling my friend Will. Clarke to me with a sponge to cleanse the wound, we saw six pieces of the scull sticking on it: some of them were of the first table, others of both tables. Besides which, there were various fissures, *sedes*, and some fractures, with depression, made by sword, musket-stock, &c. We freed the scalp of those bones, and returned it upward so far as we judged it necessary; then cutting off what was superfluous, tacked it to the sound parts by several stitches distant from one another, leaving a space to dress the depression and greater fractures. Then we dressed up the wounds with digestives *ex terebinth*, &c. and where the dura mater lay bare, we applied pledgits dipt in *ol. ros.* and to the other parts of the cranium, *liniment. arcei.* The alarm growing hot of the enemies entering the city, I left Will. Clarke to bind it up, and made my way out of the town. But this young chirurgeon, being taken busied in dressing the wounded soldiers, had liberty, after the heat of the fight was over, to employ his charity in dressing some of them, and writ me since this soldier's particular case: viz. The third day he found him pretty hearty, and his wounds mattering so very much, that he was necessitated to cut loose two of the stitches, to give vent to it: then he dressed the penetrating wounds with *mel. ros.* and the cranium with lint pressed out of *spir. vini*; and proceeding accordingly in the cure, saw the depressed and mangled bones cast off, incarn, and cicatrize with the rest. The soldier, being thus cured by him, made a voyage to the Indies, and since had served a soldier in the Tower of London.

"During the war (says Wiseman) I was frequently employed in the dressing of some one person or other, wherein I have seen all or most of the several sorts of fractures. I have dressed many that have been cut through the scull, *the shivers of the bone lying pashed with the flesh and the hair, upon the dura mater*; yet the patient hath had no symptom of such a wound." Here, in a few sterling words, are descriptions which will better satisfy all your doubts than the most learned arguments.

So much for open wounds, when the clean incision of a weapon seems to have done the business of the trepan. But, even in cases where the bone is fractured with a wide and portentous fracture, or when it is actually depressed in a way which might vindicate the application of the trepan; in cases where it requires some courage to refrain from operating, the patient is cured with surprising ease. I can be at no loss in proving this in a thousand various forms; if I could feel any difficulty, it must be only in selecting the cases which best represent the variety of cir-

cumstances. Mr O'Haloran, who practised in Dublin, the metropolis of broken heads, might very naturally feel himself engaged to write on fractures of the scull: In his paper in the Irish Transactions, we find, among other cases, that of Edward Power, "who received a desperate wound of a back-sword, extending from the top of the coronal bone to the orbit of the left side, forming *an extended and frightful chasm*, in which were included *the bone*, *membranes*, *and brain*. It bled considerably, as well may be supposed. He remained exposed to the air for near three hours after, and had not so much as a bit of rag to cover it: fever and inflammation of the brain might reasonably be apprehended; yet, by a couple of bleedings, and some other antiphlogistics, the man was completely cured in five weeks, without exfoliation or the smallest operation."

On one point you may naturally feel some hesitation: You see that clean wounds, as when a trooper is cut to the scull with a sabre, are not, (even when the scull is fractured, or part of it sliced away,) attended with that danger which was once supposed; but fracture of the scull produced by a heavy blow, where the bones are broken, perhaps depressed, may be, nay must be, an injury of quite a different nature. You are not only to refrain from trepanning fissures, in the absence of dangerous symptoms, but, if I may advise you, even fractures very wide and gaping. "John Smith," (says Mr Hill in his Book of Cases,) "when forty years of age, had several inches of the scalp torn off by the kick of a horse, and some of the hair was beaten inwards through a long fracture of the scull, which was so wide that there was no occasion for the trepan. He recovered in a few weeks, and is well." Why does Mr Hill announce this fact in such abrupt familiar terms, but because he well knew that this was no unusual accident, that he had often seen such fractures of the scull spontaneously cured.

Even deep depressions and very irregular fractures heal, and, what is more rarely to be found, are permitted sometimes to heal, undisturbed: The case of James M'Cartney, a boy of between five and six years of age, is of this nature: "He had a large piece of the parietal bone driven deep in by a stone. A few days after he was stupid, dosing, starting, and vomiting: there was a large tumor and obscure fluctuation on the depression, owing to some ounces of blood below the pericranium; on piercing of which, it sprung out to about a foot's distance. The incision was continued across the depression and fissures: to prevent such exfoliations as often happen, the scalp was *instantly laid close down again*, with soft dossils only in the wound to keep it open. As no

bad symptoms intervened, the fissures being wide enough to allow a passage from within the scull, nothing farther was done but lessening the dossils gradually, till it healed, which happened in a short time, without exfoliation. The hollow is considerable, and will continue for life.*" He is in good health, and at sea.

You will naturally say, What then should we infer from these cases? Are we to do nothing in fractures of the scull? Are the instruments hitherto appropriated to fractures of the scull to be thrown aside? The trepan is not the instrument appropriated to fractures of the scull, but that with which we perforate the bone, when either fracture or any other kind of occasion requires such opening; and of all the motives for using it, that of fracture of the scull is the least frequent: you perforate the scull to let out extravasated blood which oppresses the brain, to open abscesses which could never force its way through such resistance, to raise depression, if you will, but never on account merely of fracture. Allow yourselves but to consider in what fracture of the scull differs from that of any other bone: not in want of circulation in the scull! you have every proof that its circulation is lively and perfect, since the dura mater is detached, the pericranium scraped off, the bone itself bent from its right direction, sometimes raised up, sometimes depressed *, and yet it does not die: you see the integuments coarsely torn off with a stone or a carriage wheel; you see the scull rough, yellow, and apparently void of circulation; you see every threatening appearance of caries, and would believe it dead: Often the wound seems as if a part or the whole would exfoliate, yet in a few days all the naked part of the bone begins to look red; a fine velvet like down of vivid granulations begins to appear in spots and clouds upon the bone; sometimes these granulations are, out of mere wantonness and ignorance, scraped off, but they instantly sprout out again: what becomes of the rima fissure, or fracture, is never observed; it is covered in by this pile of granulation spreading slowly over the bone, and uniting it with the integuments. This process I have seen with admiration, where I could least expect it to take place; in old creatures of ninety years of age, very poor and miserable, and in whom, along with fracture, the integuments had been so mangled as to slough off in flakes. It is just such a delicate pile of granulations that covers the surface of the dura mater, when it appears after the operation through the trepan hole, uniting the dura mater with the integuments

* Hill's Cases, p. 117.

and with the margins of the perforation.—Those who affirm that there is no danger in trepan, affirm of course that there is none in fracture of the scull, for the perforation and the fracture heal by one process, and with an equal pace. If this, which I have observed many times, be the regular and natural process of healing both in the trepanned and in the fractured scull, what apology have we for perforating the scull, and tearing with levers all those parts we think suspicious or perceive to be depressed?

The motives assigned for making large and frequent openings are, in case of simple fracture, to prevent danger; in case of depressed fracture, to raise up the depression; in case of extravasation or abscess, to let out the blood and matter freely. But, are not the smallest openings we can make sufficient to give vent to any suppuration, as the smallest puncture is sufficient for the cure of the largest abscess in any other part? Is it possible, would it be prudent in any case to lay open all that part of the scull under which blood is effused? Though you were to work with your trepan as industriously and unconcernedly as a button-maker, or to trepan as this Henry Chadborn did twenty-seven times, you still would never get to the end of your operation, if the extent of the extravasation were its only limits: I have rarely seen a case of extravasation where the cake of blood did not extend over one entire hemisphere! under a whole parietal bone, and generally down to the basis of the scull, nor an abscess but where much of the surface of the dura mater was coated with pus: I have never had the good fortune to perform or assist at any operation in which it was possible, had we been so extravagant as to design it, to expose the whole coagulum of blood by perforations: In short, what I have observed, is this; that, where, in the case of abscess, we are fortunate enough to be alarmed early, one perforation gives vent to the pus as well to my apprehension as fifty: the matter bubbles out at each systaltic motion or heaving of the brain; nothing prevents it but that fungus or protrusion of the brain, which so frequently happens when the openings are large, that I may almost assure you that, where the openings are made large, they never continue long free, but are plugged up by protusion of the brain. In the case of extravasation, which has no certain limits, I have always been sensible of the folly of trying to lay it all open, for then the limits of our operation could only be the limits of the scull: But after one perforation, when, by the heaving of the brain, the clots have rolled out of the trepan hole, as thick and black as pitch, there succeeds a more fluid blood, the patient often finds instant relief, moves his paralytic side, raises his eyes, and though, without being able to speak, knows his friends; from day to day, the blood by the

natural process of its dissolution, and by a sort of secretion from the surface of the dura mater, is diluted and flows out. The introduction of the probe, often to the extent of six inches in every direction, proves how vain it were to attempt laying open the whole extravasation: the deep introduction of the probe has probably suggested that practice, which is mentioned in books, of making a second and far distant perforation as a counter-opening, but which I cannot approve because I have never seen it necessary: the probe bent and surrounded with a little lint, or a long hair-pencil, is very useful in hooking out the clots, and an injection of tepid milk washes them away. While the coagulum is thus resolving, the dura mater is suppurating and cleansing on its surface; it is at last seen through the trepan hole of a lively red, granulating and bleeding upon the slightest touch: then it comes into close contact with the lower surface of the scull, protrudes with a gentle convexity through the trepan hole: the granulations of the integuments, scull, and dura mater gradually adhere, till the whole becomes one undistinguished granulated surface, where bone cannot be distinguished from flesh. This is the state of matters, (with occasional interruptions and variations,) in the third week, and thus the opening closes and heals. I have often found it necessary, from the strong protrusion of the dura mater into the trepan circle, if not through it, to repress the dura mater at each dressing with the probe wrapt in lint, in order to give exit to the matter or blood *.

This I can most safely affirm, that wherever I have seen cases of fracture whether simple or depressed, committed not injudiciously nor carelessly to nature, they have done well. Wherever I have found the surgeon impatient to perforate, intent on raising every depressed part of the scull, careful to include in the circle of his saw every suspected piece of bone, and anxious to secure a free evacuation of matter by large openings; I have seen such tearing up of the scull, especially in boys, as I could not witness without pain, uniformly followed by protrusions of the brain and death. In no other part of the body do you open abscess or discharge extravasated blood by large openings; is the brain the only part to be thus roughly treated and exposed to the air, to dressings, and to every thing that is supposed to injure it?

Are we then to do nothing in fracture of the scull?—Nothing I believe which

* In the circumstances here described, some physicians have ordered counter-openings, others have used leaden canulas, grooved or guttered probes, &c. to conduct the matter or blood from under the cranium: I have never found these necessary.

you should not do in fracture of any other bone of the body *. Pick away the fragments of bone, lay the edges of the lacerated scalp quietly and smoothly together, stitch them that they may lie in that nice contact which is necessary to procure adhesion, but not tight lest they inflame: lay all smooth, nice, and close, dressing the wound daily and lightly that it may adhere, which often it does to a miracle, the dura mater, trepanned circle, and crushed bones, and integuments, all consolidating in one firm scar: preserve the patient carefully from every irregularity or excess that might cause inflammation; keeping him quiet, cool, low in diet, and without wine. Be assured that the experience of a Wiseman, and the good sense of Platner are not to be despised: remember what Platner affirms, "Si nulla mala indicia sunt, modioli usus supervacuus est." Adhere to this general maxim announced from such high authority, and it shall be my care to explain every exception so fully as to prevent you, while you avoid the fault of hurry and impatience, running into any fatal error from neglect. You see with what perfect confidence these celebrated men dressed up a fracture, and committed the case to nature, while men of less experience or knowledge would have been busily occupied in scraping every limb of the fracture, and in applying the trepan to each. But they were emboldened by the best of all teachers, experience, to act thus: and whatever prejudices in favour of operation you may carry with you from the school, to this opinion must you return at last. I can safely declare along with O'Haleron that, "in cases of fractures of the scull, long experience has convinced me that many of them require no operation." If there be any exceptions to this rule, it must be when the fracture is accompanied with depression.

* "In fractures of this bone, when you have made way for the relief of the brain, and reduced the broken parts into their places, such of them particularly as are not entirely separate, you are to take care that no more of the said fractured cranium be removed than necessity calls for; at leastwise, any large portion thereof, by which the membranes, and sometimes the brain itself, may be exposed, at least, the cure protracted: For since we see daily that other bones, divided in like manner, are united by mediation of a Calius, nature is as little wanting here, from the broken edges, together with the diploe or marrow interstice, to provide a cement for their coalition, more especially in those we call wounds of the cranium, where large pieces are sometimes divided by a sword or scimiter in close engagements, and have been left adhering to the pericranium and scalp, which, being replaced, and the external wound stitched up, having often been found united as other compound fractures.—*Turner, page* 217."

Skull · Chizzelers, Mallets &c. Page 704

DISCOURSE II.

ON FRACTURES OF THE SCULL WITH DEPRESSION.

I MUST seem then to have admitted that " depression of the scull oppresses the brain, and requires to be raised up with lever, or cut out with the trephine :" Yet there is no general conclusion I should more unwillingly allow ; I should be inclined rather to reject the general rule than qualify it with so many perplexing exceptions as it would in my judgment require : There are many depressions so fixed that no force of instruments could raise them ; so extensive, that to cut them out, or loosen and pull away each fragment of bone, would be to open half the cranium, and expose the brain to protrusion, on account of imaginary dangers. Depressions seem many times so alarming to the surgeon, that to raise them, or cut them out, he will use the most unjustifiable violence : yet, though he fails, and the depression remains, the patient, notwithstanding this additional violence, survives : and many times the depression, which has been the subject of such unjustifiable violence, though very conspicuous while the surgeon is labouring to raise it, is really so slight as to vanish even before the wound is closed.

The striving to elevate depressions of the scull, while the patient, far from having any oppression of the brain, is crying with torture, struggling and resisting, though it has been long esteemed the most meritorious work in surgery, is extremely censurable, and has, to my certain conviction, brought many a patient to an untimely grave. " I shall now (says O'Haloran) remark on such fractures as necessarily require the operation in the *first instance* : These are fractures accompanied with depression, with or without wounds : for, not to advert to the *restraint* such pressure must necessarily cause to the motion of the brain, *sufficient*

in itself to produce fatal effects, &c." This is affirming, in its utmost latitude, that very mistake on which all the bloody doings of past and present ages are to be attributed. " If a single operation (says Warner) be insufficient (as I have often known it to be) to effect the elevation of the depressed bone, a second and a third must be performed, that the surgeon may be enabled to *raise up every part of the depresed bone*; which *rule* must be *strictly observed*, otherwise the operation cannot be expected to be attended with success, as the *bad effects of the oppressed brain* must remain." In every elementary book you read the same language, and from every lecturer hear the same general conclusion; for, in describing the scull, he assigns depression of it and its fractured part intruding upon the brain, as the principal occasion for using the trepan.

This passion for leaving nothing undone will naturally glide into your minds; for the prejudice of every profession is in favour of what its art can accomplish, and in ours this bias is peculiarly strong: trepaning fractures, raising depressions, and making ample openings for blood or matter, are the surgeon's chief pride. But I cannot help recollecting the droll expression of Permanmus, who says, or his translator for him, " There are many persons who fondly imagine that boring a hole in the scull is an easy matter, and to be done at any time, whereas it requires *mature consideration*, a very *able head*, and a skilful hand to undertake it *."

Aware of the deceptions to which you are exposed, I should feel myself much to blame did I neglect to warn you of them. You will say within yourselves, " Though it is plainly our duty, and is most natural, to leave a mere incision or wound, although it affect the scull itself, untouched and but lightly dressed, since we know that wounded bone will reunite with the soft scalp; though it be equally natural and right to treat a compound fracture of the cranium, even where it is much shattered, like a compound fracture of a limb, by picking away the loose bones, cleansing the wound, composing the soft parts, and laying all smooth and close; is it equally natural or proper to leave unreduced a depressed portion of the cranium, which cannot but press upon the brain?" " Surely, (you would say), the visible depression of a piece of the scull must be an oppression to the sensorium, of the worst and most dangerous nature, because it is sudden or rather instantaneous, and because it is produced by a firm and solid body: blood and matter being fluid, may

* Page 15.

be absorbed, and thus time may lessen that kind of pressure; but what can remove the compression of a firm and solid bone? Are we to remain, you would be inclined to ask, unconcerned spectators, whilst our patient labours under a visible depression of the cranium?"—These are real difficulties, and must be answered; and facts will hardly persuade you when balanced against such strong probabilities: but the whole question shall be fairly laid before you; it is one of those which I stand pledged to discuss with soberness and deliberation; it is one in which you must learn to decide on sure principles, since you are about to enter on that scene where responsibility rests on each of you, where you must trust to your natural reason, not to the dogmas of any teacher, and suit your practice to the various exigencies of each case.

There is a wide difference, in theory and in fact, betwixt the oppression proceeding from extravasated blood, and that from depressed bone. It is because bone is firm and immoveable that its depression does no harm! for the pressure it causes is permanent, not progressive; it is fixed and complete at once: if the patient be not struck insensible the moment the bone is beaten below its level, he never can become so; and you will find, by a singular variety of proofs, which I am now to lay before you, that he seldom becomes insensible. The brain is capable of accommodating itself to any degree of pressure which is fixed and stationary, and that arising from a depression of the scull is so slight that it can hardly be estimated; for the depressed portion is a very small segment of a large circle: the broadest depression possible is not equal to one-tenth of the whole convexity of the cranium. The smallest deviation from a circle seems very great, and that depression which is very visible outwardly makes no sensible impression within: the depressed portion of the cranium is so little off its level, that it merely exposes a rough and rising edge, never exceeding the whole thickness of the bone: the fractured and depressed portion dips only at the line of fracture, and declines very gradually from the line where it is level with the scull to the line of its greatest depression: a depression even of three inches long, of the parietal bone, for example, (Vide (*a*) figure 1. of fractured sculls) declining gradually for two inches, and terminating in a depression of the depth of a fifth of an inch, (i. e. the full thickness of the most substantial scull), must produce an abridgement of its cavity inconceivably small, as is marked and demonstrated by the dotted line (*c*. fig. 1.)

The slight effect that could, in the worst depressions, be produced by intrusion of the bone, would be to exclude from the regular circulation within the head a very

trivial proportion of blood: indeed I know not whether the slightest fit of coughing would not both affect the function and endanger the structure of the brain, more than the deepest depression I have ever chanced to see. It is, on the contrary, because blood is soft and fluid that it has all the effects of a solid body, and that its pressure is irresistible: the effusion is not instantaneous but slow; every time the brain subsides, i. e. at each respiration, more blood exudes from the ruptured vessels; it is injected betwixt the scull and dura mater by the force of the circulation: this internal haemorrhagy is probably not complete at first, but is renewed in paroxysms; it is not limited to one spot, but is diffused over the whole hemisphere of the brain: the extravasated blood has, by accumulating and coagulating, all the effect of a solid body; nay more, as it increases in quantity, in proportion as the brain yields, it acts with the force of a wedge, which presses harder the deeper it is driven. Such is the difference betwixt the injection of soft blood within the firm cranium and depression of the scull.

But these are only arguments, which you dare not trust to; you must have proofs more relevant than this; and the facts I have to display are really singular. It having once become an acknowledged maxim, that the surgeon should trepan every fracture and elevate every slight depression, no one having any opportunity of seeing, a pure case of depression where the surgeon had not been busy, it might eventually have been very difficult to prove that it is safe to leave such fracture untouched. But a thousand favourable accidents have betrayed the iniquities of this rash practice, and proved, in various ways, that the surgeon has been usually occupied, and often with extreme violence, in elevating fractures which had been better left alone: Sometimes, in the hurry and confusion of such a bloody scene, a remarkable depression of the scull has escaped investigation, the patient has escaped the violence and dangers of an operation, and the surgeon has been sensible of the deep depression only by feeling it through the scalp when the man was well: Sometimes relations and friends have interposed and prevented the well-intended operations of the surgeon, who has protested against leaving a great depression unreduced, and prognosticated death, yet the patient has recovered: Sometimes, the surgeon having leave to do his work, having made his perforations and pushed in his levers, has found the depression too deep and too firm to be raised; after every justifiable and every unjustifiable violence, he has been unable to raise the depression, and has not dared to cut it out; he has left the patient in this desperate state, and yet seen him recover after such violence, added to the deep depression: Sometimes when, from the foul air of hospitals, or the prevalence of

epidemic diseases, the surgeon has been deterred from his favourite work, he has discovered, with equal pleasure and surprise, that " more recover (to use the words of Perusinus) by medicines than by the knife and the saw *." Indeed, the conclusion against the profession and its general propensity to operate, in mere injuries of the scull, is stronger than I believe you are aware. I know that if you had seen along with me the precipitation and violence with which depressions of the scull are torn up, and the miserable consequences arising from large openings, both your reason and your feelings would revolt against the practice.

" I chanced once (says Platner †) to be called to the assistance of one who had fallen from the third storey of a house, and lay quite torpid and oppressed as in a deep sleep. The surgeon, having shaved his head, found there a very deep and wide depression of the scull. While we were wondering how the scull could be thus deeply impressed by the fall, the integuments being but slightly ruffled, the man recovered his senses in a fortunate hour; alarmed at the proposal of an operation, he told us that the impression we had observed was of no importance; he had it from his childhood; and yet had lived in perfect health: he recovered without assistance." We are at a loss to conceive how, even where the integuments remain entire, so wide a fracture and so much depressed, can be consolidated without any ill symptoms; but several cases which I have myself witnessed make the process quite familiar to me: and one related by Botallus I think particularly worthy of your notice: ' Some (says Botallus) will very readily acknowledge that bones, fractured without an external wound, are easily cured in other parts of the body, while they deny the bones of the scull to be thus cured: I will relate plainly what I have myself seen. While I practised surgery, a boy, as I guess about seven years of age, fell from a gallery twelve feet high, and pitched directly upon his head: The parietal and part of the frontal bones were so fractured that you could feel distinctly the several fractured pieces, yet the skin (he having fallen upon a flat pavement) was not wounded, nor even the hair ruffled. When called, I was altogether confounded at finding such a fracture, the boy speaking and in his perfect senses, with only a slight acceleration of pulse, (he was however in-

* " Jacobus Perusinus Romae celleberimus atque optimus nostri saeculi chirurgus, mihi refert, se longo usu observasse, *magis servari eos qui citra scalpelli operam* partim lenientibus partim siccantibus curantur, quam quibus cutis inciditur et os aperitur."—*Vidi Vidii Opera.*

† § 557. b.

sensible at first, and had vomited up his dinner along with some bile) a thousand thoughts passed across my mind, while those I had sent to the apothecary's were returning with some medicines. I was for some time irresolute whether to make an incision and pick away the fractured bones, or to leave the parts entire: at last I resolved on this more lenient plan. In place of making an incision, I covered the whole head with Armenian Bole, Myrtle Berries, and Rose Leaves, mixed with vinegar and white of eggs; and this astringent application I used during four days. The boy perfectly recovered without incision; he lived many years; and, though I do not recollect his name, I have reason to believe he is still alive *." This ingenuous avowal of Botallus, that he was altogether confounded at feeling such a fracture, and that a thousand thoughts had fleeted across his mind, makes the case highly interesting: we are conscious, from the conclusion of the case, how dangerous these thoughts were to the patient, and must feel that when they present themselves to our imagination they should be resisted; had he yielded to those very natural fears, and made incisions to pick away the bones, I doubt not the boy would have been lost.

Parents have often with seeming perverseness refused assistance in the last extremity, and even the earnestness with which it is offered is a motive for refusing it; despair makes them unwilling to disturb the last moments of their child, which, being left undisturbed, recovers; what the fate of such a child might be if trepanned, must ever remain doubtful.

I was called once to a child, whose circumstances seemed so very desperate that I urged the parents to allow of an operation, which fortunately they refused. "This little girl, about twelve years of age, was playiug with her school companions on the very steep declivity of the Earthen Mound: two of them were running, hand in hand, when this little girl, losing the hand of her play-fellow, rolled from top to bottom of the Mound, with continually increasing velocity, till at last she pitched with her head full against a low wall, at some distance beyond the bottom. She was carried home in a chair, stiff and motionless, perfectly pale, and without pulse; she hardly breathed; and we had no evidence of her being alive but a slight degree of warmth, which, after cutting off her clothes, (for she was stiff as well as motionless) was difficultly increased to a natural warmth.

"From this time she lay in a deadly stupor, with a blemish on one temple; there was no tumor, but flat integuments, through which I imagined I could feel a fracture and

* Page 725.

depression of the parietal bone, while the signs of accompanying extravasation seemed very unequivocal: her limbs were stiffened; her whole frame in a sort of tonic or permanent convulsion: her jaws firmly and immoveably locked; her extremities cold, and her pulse oppressed and intermitting. In this state she lay for four or five days immoveable; hardly was a tea-spoonful of wine and water admitted betwixt her teeth, which were firmly and immoveably closed. I was then persuaded, and remain so, though she happily recovered, that there was extravasation under the parietal bone; and my persuasion was so great that, on the fourth and fifth days, I solicited her parents to allow of an incision, and even spoke to the clergyman, who was called to them at this dismal time, to persuade them to consent. On the sixth day she yawned widely, and from that moment her jaws were loosened: we could now put in a few spoonfuls of wine and water, and give purgative medicines; but she lay still and dead, in the most profound stupor I ever witnessed. She began in the second week to stir the limbs of one side a little, and in two days more she stirred sometimes an arm, sometimes a leg, of the opposite side: then her eyes opened at times, and she began to mutter and speak; but it was the fifteenth day before this low muttering came on; and then, and till the twentieth, though her eyes were open, we had unquestionable evidence that she could not see; a candle approached to the eye gave no sensation, the eye did not follow it, nor were the eye-lids closed as expressive of impatience of light, and the pupil was as much dilated as if she had lain in a dark place.

"She now became restless, the struggling of the limbs of both sides increased, she put out her hands and stretched her limbs with a sort of trembling, and muttered perpetually. On the fourth week, she came to swallow more easily, to take the drink which had hitherto been poured into her mouth, and to speak rationally. She next sat up in bed, was raised into a chair, and gradually recovered her senses and her strength. She was then able to be led about the room, but two months elapsed before she could be said to walk: even then she was never left alone, nor walked unsupported. She was led about the whole summer in this weakly condition; but is now a strong and healthy girl."

"That excellent chirurgeon, Arnoldus Tholinx and myself (says Ruinhuisen) were consulted about the child of a Sea-Captain, which had fallen from the upper-deck of the ship to the bottom thereof, being the height of eleven or twelve feet: and here the trepan being judged necessary upon the dangerous accident's ensuing,

and by us proposed as such to the parents of the child, but by them refused; we employed nothing but convenient fomentations, and proper ointments, and the like; by which means the child was happily recovered to the great instruction of myself and the benefit of others *."

That you may have every kind of benefit from such ingenuous communications, I shall represent to you one or two scenes on the best authority. " Mr Avellan † relates the case of a little girl fourteen years of age, who, after a blow on the head, faintings, vomiting, and delirium, from a depression of the right parietal bone, lay in an oppressed state. Her condition plainly required the trepan, which yet her mother pointedly refused. The faintings and delirium continued no less than three months, the girl remaining in a state of idiotism or silliness; but, in process of time, the depression vanished, and the symptoms entirely disappeared ‡."—" A little girl, (says Marchetti) a child of the house of Ridi, having fallen over the stairs, and struck the occiput against a stone step, had a conspicuous depression of the scull, but without any laceration of the scalp: the parents refusing to hear of incisions or other operations esteemed so necessary in cases of this nature, medicines alone were applied for abating the inflammation, and the child, opposite to the belief of all

* Ruinhysen, page 153. † Academei de Chirurgie, tom. i. &c.

‡ At other times various accidents have prevented these operations which the surgeons believed to be essential to the recovery of the child: witness the case in the academy memoirs which immediately succeeds this. " A child of ten years old fell from a height of thirteen or fourteen feet; tumors immediately rose on each side of the head, on its upper part, covering partly the frontal partly the parietal bones, longer than two eggs. The surgeon opened the tumors; found each parietal bone naked to the extent of an inch or more. On the left side, the fracture and depression were so deep and gaping that a spatula was easily passed betwixt the depressed brain and the scull: while the coronal suture was separated, so that you could introduce a probe into it: Both the depression and a manifest effusion of blood upon the dura mater, required the trepan; and though it was resolved on, it was by some accident deferred, became unnecessary, the blood flowed through the fractures, the depression rose of its own accord, and all the symptoms vanished."

L'enfoncement des os et un épanchement qui s'etoit fait sur la dure-mere, exigeoient le trépan: on s'y determina même d'abord, cependant il fut différé, et par ce delay l'opération devint inutile. L'écartement, joint à la situation que M. Duprey donna au malade, procura vers le cinquiéme jour *une issue au sang extravasé, l'os se releva ensuite de lui-même, et tous les symptomes disparurent.*

the medical attendants, was perfectly cured, not without a conspicuous depression remaining; she is married, has a family, and still survives in perfect health *."

Perhaps there is no rule in surgery more correct in theory, nor better supported by authority, than that which warns the surgeon to beware of being too busy in raising the depressions of the sculls of boys; perhaps a strong conviction of this was among the motives which induced Hildanus to speak of so many idle and puerile inventions for *sucking up* depressions of the scull, for he declares, in the most express terms, against using instruments, saying, " Puerorum Calvaria ex casu deprimi posse nullis supervenientibus symptomatis †. Scultetus, in place of labouring with instruments to raise the depression, wraps the boy in a warm sheep's skin :‡ And Turner, a man of observation and strong good sense, says, " where there is a depression of the cranium, provided it be small, like the superficial dent in some pewter pots, the patient young, with convulsions, delirium, stupidity, or other mischievous symptoms attending, *you must not* presently go *to work with your instruments*, but treat the case as a contusion §. " A gentlewoman, (says Turner) very nearly related to myself, has the most considerable impression of this kind, occasioned by a fall in her infancy, that I ever met with, *there being room to hide a finger in the dent*, on the back part of the head ‖."

No other proofs need be required, since, always when by chance these depressions escape the busy inquiries of the surgeon, the patient is saved; were any such proofs required, we might find them in the early work of the good old surgeon Berengarius, who says, " Not only in childhood, but in various ages, have I seen great depressions, and conspicuous cavities, with very remarkable fracture, cured, without any ill symptoms, by plasters alone: I have, at this very hour, a boy under cure, having his scull depressed, the depression most remarkable, without one ill symptom **."

* " A natura fuit sanata superstite tamen insigni depressione ossis."

† Page 83.

‡ In depressionibus puerorum, sine rima et laevis accidentibus, ab omni chirurgia abstineo, et pellem agni callidam exhibea rasis capillis, &c. Vide Scultetus, p. 111.

§ Page 213. ‖ Page 214.

** " Ego tamen vidi compressionem magnam et notabilem, in alia aetate quam in pueritia, absque fracturâ ossis manifesta, et non erat rupta cutis, erat tamen concavitas in capite notabilis, et per emplastra sanati sunt, et non fuere mala accidentia aliqua. Nunc quoque habeo puerum unum in cura cui os est depressum depressione magna, et nullum est malum accidens.

The practice of those who believe it to be their duty to scrape every fissure, and raise every depression, who are ever ready *to go to work with their instruments*, affords the most fatal and melancholy proofs of the improvidence of such practice; and we find practical errors narrated, by the best modern surgeons, with a non-chalence, and want of consciousness, altogether astonishing. " I cured a boy (says Marchetti) of seven years of age, who, from the kick of a horse in the forehead, had a very remarkable depression, which neither tripod nor lever could any way elevate; but there being a fissure in one part, I betook myself to the rugin, dilated the fissure, so that the serous humour had leave to exude, while the medicines had leave on the other hand to penetrate to the dura mater, so that in the course of forty days, flesh being regenerated in the fracture, the wound was safely and soundly cured *." But, had the celebrated Marchetti been permitted (as it was a wonder his authority did not prevail) to trepan this little boy, to tear up the scull with his tripods and levators, it is possible at least, that even after such violence, he might have survived, and then the operation and the operator would have been applauded for saving the patient's life; and had the elevation of the bone been accomplished, though with every circumstance of violence and rudeness, the operation would have become memorable. Such a case is that recorded by Mr O'Haloran, in which every principle of sound surgery was violated. He found a child with a depression of the scull with the integuments entire, and the senses quite composed and perfect, when, without any motive but his own unmeaning fears, he, in opposition to every good authority, cut open the scalp; and that depression, which had hitherto done no harm to the child, he elevated in the rudest and most shocking manner, making no fewer than four perforations in the scull of the child, thrusting into each hole a levator, and to his four levators he had two surgeons, who seem to have had as little tenderness as himself, for they pulled with might and main, till the depressed bone rose with a sudden spring. But here is his own narrative.

" A girl, *about seven years of age*, received *a severe fracture*, *with profound depression*, on the left parietal bone; *the integuments were entire*, *the girl quite com-*

* " Curavi puerum septem annorum, cui in fronte ab ictu pedis equini facta fuit insignis ejus depressio, quam nec triploide, nec vecte attollere potui. Verum quia in quadam ejusdem parte aderat rima, scalpro abrasorio eam dilatavi, ex qua aliquae serositates emanabant, ut medicamenta ad membranam usque pervaderent," &c.

posed and sensible, but the depression was so deep that it could contain a very small egg. Such was her situation when brought to me half an hour after the injury. Seeing that it would require three or four crowns of the trephine to raise this extended fracture, I requested of Mr Wallace, a military surgeon, and Mr Pierce, to assist me in this charitable work. I removed all the integuments, wiped away the blood, and whilst these gentlemen with their fingers made compression over the bleeding vessels, I began to operate on the inferior parts of the bone. I then commenced a second on the upper part, and in a line with this; but two elevators, though acting at the same time, had no effect on the depression. Two more crowns were then applied to the sides of the bone, and parallel to each other. *Four levers acting in conjunction, it astonished me to see with what a sudden spring the depressed parts resumed their former station.* Notwithstanding the great extension of this fracture, the loss of covering, and of the bone itself, by four crowns of the trephine, this girl never after had the smallest untoward symptom."

Is it by such narratives and such proceedings that the good repute of surgery is to be preserved? by no means: We should at first sight be inclined, both from the violence used in raising this depression, and from the success of the operation, to ascribe the patient's safety to the intrepidity of the surgeon; but what should we have said of Mr O'Haloran's practice had he miscarried, and been unable, with his military assistants, his pair of surgeons and double pair of levators, to raise the depression, and yet the patient, after all kinds of violence being added to the depression, had lived? There is not in the narrative of this case any shadow of proof that the patient was saved by this mode of operation: the child was composed and sensible, had no bad symptoms, and would have had none to the very end of the cure, had she been left alone: it proves merely what is but too surely true, that often the patient survives the most imprudent things the surgeon can do.

I will now produce you evidence that I put no worse construction upon this case than it should bear: It will prove to you, that, even where the depression is broad and deep, where convulsions have ensued, where the surgeon, alarmed at these signs of danger, has made his incisions and his perforations, and tried ineffectually to raise the depression, the patient has survived both the depression and the ineffectual operation, which must ever be a violent one. Mr Hill undertook, in an unfortunate hour, the following operation. " A boy of the name of Carson, between five and six

years of age, by the kick of a horse, had a *long piece of the os frontis beat in flat*: He slept sound, as the people termed it, about two hours, and then fell into strong convulsions. The extravasation was so great externally, that the precise quantity of the bone depressed could not be determined, till the blood was discharged by a horizontal incision along the depression, by which I discovered it to be *of an elliptical form, extending above two inches across the forehead, and above the right sinus frontalis*, with a fissure all round it. The external discharge not relieving him, showed that the perforation would be necessary; and, therefore, after allowing the first incision to bleed some ounces, it was stopped by dry dossils. Being determined, for the reasons formerly given, not to touch the depressed part, unless some symptoms should afterwards make it necessary, I continued the incision till there was room for perforating a quarter of an inch from the fissure, at the right end of the depression. The bleeding was troublesome; but no arteries required to be stitched, but were stopped by dossils dipt in ardent spirits, and applied for half an hour. After which, just as much of the pericranium was removed as was necessary to admit the smallest head of the trepan.—The connecting blood-vessels betwixt the dura mater and scull were broken through the whole extent of the depression, being at least two inches; *for so far I introduced the levator, without opposition, and attempted, with a good deal of force, to raise it; but in vain.*—After the extravasated blood was discharged, *three intersected stitches were put into the first incision above the depression, and it united in a few days;* and the rest of the skin healed in four weeks, without the intervention of any bad symptom.—He is well, 1771; and the depression, owing to his youth, is so expanded by natural growth and the callus, as not to be much perceived."

If any thing could repress the presumption of a man of an adventurous temper, this must: To propose an operation under protest, that it was the only possible means to save the patient's life: to attempt that operation: to see the patient survive the depression, which had been declared fatal, unhurt by the additional violence of incisions, trepans, and levers! Surely these facts should lead the surgeon, who had been in the habit of elevating inexorably every slight depression, into a new train of thought.

The prominent points of this case of Mr Hill's stand, in common sense and plain argument, thus: First, The depression, while it continues, does no harm, the boy being in his entire senses: Second, The surgeon is so alarmed at the very

appearance of depression, that he labours with every degree of violence to raise it, his own reputation, as well as the patient's health, seeming to be at stake: Thirdly, Abandoning the operation, and leaving the depression as he found it, he puts three stitches in the wound, and so the integuments unite over the depression in a few days: Fourthly, The patient is no sooner recovered, and the wound healed, than the depression, which appeared so formidable to the surgeon when seen and felt at the bottom of a bloody wound, the depression, to raise which he willingly risked every thing, disappears spontaneously, so little is it off the level *.

It is from no petulant desire to injure the reputation, or criticise the practice, of a man so justly valued by his profession as O'Haloran; there are, in the works of some modern writers, absurdities which no one will condescend to criticise: every necessary criticism of his practice is in truth a compliment to his authority, which is such that I would not willingly leave unrefuted any thing in his writings that seems to me dangerous.

" Patrick Casey (says Mr O'Haloran) was thrown from his horse, with great force: the consequence was, fracture in part of the coronal bone, with great depression. I was requested, next morning, to visit him; and, seeing his condition, I was just proceeding to the operation, when a surgeon of the city appeared, who said he was employed by Casey's master to attend him. The depression was so considerable, that the lower edge of the fracture was beaten under the injured part; here I intended my operation, in order the more speedily and effectually to disengage the fracture: But this was opposed; it was observed, that trepanning so low down would leave a great deformity, and that the end proposed would be as well answered by perforating the bone at top. I opposed it in vain: I saw that the friends of the boy who were present, as well as himself, wished to have it done so. *I trepanned, introduced the levator, but could make no impression, as*

* These are not solitary, nor even rare cases. Read the following from Mr Hill. " February 24. 1750. Mr Robert Rae, when a young man, fell backward from his horse on a rock, about twelve miles from Dumfries. By his foot sticking in the stirrup, he was dragged some way, till the girth broke, and left him with his head betwixt two stones in a rill of water, where he would soon have been suffocated had not a shepherd boy drawn him out.—A large piece of the left parietal bone was driven in backward to the lambdoid suture, with a fissure in the right parietal forward, being like a shepherd's crook: notwithstanding the larger depression, there was no extravasation; *nor would the bones rise, though a very great force was employed*; but they exfoliated like the former, and, the aperture being wider, the protrusion was greater. The cicatrix continued soft for three years, when it ossified completely.

the depressed parts were beyond the reach of the instrument. I now proposed a second opening on the lower edge of the fracture, the first being impossible to answer the end proposed. This was not agreed to. It was observed, that an opening being made, no deposit could be formed, and that the depressed part would become gradually detached, and probably come away, which has sometimes happened. The sore was carefully dressed, but the dura mater never assumed a right aspect; *however his spirits were good, and he had no complaint but what arose from the sore itself.* The discoloration of the dura mater *made me try, on the 15th, and again on the 17th, the effects of the elevator, but in vain ! !* He was up every day. The 24th, looking out of a window for some time, he perceived a slight chilliness; at bed time he grew hot and feverish, was very restless, and had a strong shaking fit. This alteration was ascribed to his making too free with himself. But I saw and dreaded the consequences. I told the people that these alarming symptoms proceeded not from cold, *but from the constant and uniform pressure of the brain; and that if any chance remained for his recovery, which I much doubted,* it must be by a speedy removal of the cause; and if they consented, I would not shrink from this disagreeable business. *I directly made the second perforation, and soon raised the part*; but, alas! the mischief had been already completed. That day and the next he seemed a good deal lighter: but, about ten at night of the second day, his neck was observed to be covered by a bloody ichor issuing from the sore. Next morning his pulse was more languid, and the dura mater quite black. Towards night the bloody ichor increased; he became slightly convulsed with stupor. About ten the substance of the brain poured forth, and he expired next morning."

This case reminds me of the circumstances of an operation in which I was a party; where, although I was obliged to be a witness and unwilling assistant in much mangling, I saved the man a great deal more. There was, along with a wide fracture of the parietal bone, through which the extravasated blood was seen, a slight depression of it at one corner of the fracture: the trepan was applied: the extravasated blood rolled out: the duty of the surgeon was, according to my apprehension, completely fulfilled; but he was urged by others who were present to raise this depression, with a degree of earnestness which left him entirely responsible for the consequences. I most unwillingly witnessed, but would not consent to assist in this part of the operation. After extreme violence (for

always the violence is extreme where the surgeon works till he is foiled) it was found altogether impossible to elevate the depressed bone. The operator was now called upon, under the same responsibility, to make one, or, if necessary, two perforations, on the sides of the depressed portion, to raise it. I saw plainly that, if the operation, now protracted for an hour, should continue still another hour, the man would be carried off delirious; that if the scull was widely opened by two perforations, and by the tearing away the depressed bone, his chance for life was very slight. I said across to the surgeon, that if he would permit me, I should most willingly take the responsibility upon myself. On his consent, I put aside the busy fingers that were searching for depressions, clapped a piece of lint on the dura mater, and conveyed him to bed, where he mended daily, and became a very stout and healthy man.

Mr O'Haloran seems willing to vindicate himself, and is quite unconscious of the indecency of such repeated operations: he says, " but, alas! the mischief was already completed;" an expression neither delicate nor modest at the conclusion of a case where every kind of violence had been committed. A boy was trepanned, while in his perfect senses, in spite of his own remonstrances and those of his friends, this only choice being left him, viz. whether he would be trepanned at *the top of his head or at the bottom.* Very wide indeed is the difference betwixt a case thus tortured with frequent and partial operations, from that depression in which the integuments are laid nicely upon it, and the case committed to nature. A perforation was made, the levator used in vain, the dura mater first hurt perhaps by the depression, then injured by every kind of tampering, began to inflame; yet his spirits continued unabated; he had no complaint. Mr O'Haloran, perpetually watching the aspect of the sore, imagining the dura mater discoloured, first on the fifteenth, and again on the seventeenth, introduces his levator, and persists in poising up the depressed part: Still the boy's health continues good; he is daily out of bed: on the 24th, he is at the window, takes cold, and has rigors. Then a new perforation is made; the depression is forcibly raised; and the patient dies on the third day after. Far from wondering at the fate of this patient, I can safely say I have often seen such doings, and never yet saw the patient survive. Indeed this is the very case to illustrate a rule to which I solicit your attention. " Whatever you do, do with that kind of decision which may entitle you to success. If you resolve not to operate, then, after picking away the fragments, and dressing the wound softly and gently, commit the

case wholly to nature. If you are to operate, do all that you have to do at once, nor think of changing your mind with every variation of the symptoms, renewing your trepannings and using the lever at the very moment when inflammation is threatened."

Is it not mortifying, that the operation, on which the surgeon values himself so much, should be thus doubtful: That, when he has, with the usual eagerness to raise depressions, used every justifiable and every unjustifiable violence in vain, the patient lives in spite of the depression! in spite of his operation! This is a sad deception to which we are exposed: we are probably assuming to ourselves the merit of having saved those by our operations, whom we have only not destroyed, and such, perhaps, are all our boasted cures: that which is thus proved in a few cases may be suspected in many; for though there are not many in our profession who have had the strength of mind to commit such cures to nature, whenever, by inevitable causes, we are compelled to suspend our designs, nature atchieves the cure.

The bloody decrees of the surgeon against all who have depression of the scull are never so absolutely suspended, as where the ill constitution of the air in a great hospital is known, by the experience of centuries, to destroy all those who suffer operations on the head. Under this imperious necessity was Dessault, surgeon of the Hotel Dieu, who, during his administration, declined, even in the most urgent circumstances, to perform the operation of trepan, and found in the end how true the maxim is which I have just quoted from Perusinus the Roman surgeon: "Magis servari eos qui citra scalpelli operam curantur, quam quibus cutis inciditur et os aperitur."

Dessault's clinical practice, when he merely allowed the patients to lie undisturbed and quiet, with a poultice to the fractured and depressed scull, and a dose of calomel to move the bowels, exhibits a splendid series of examples of what nature, *undisturbed* by partial operations, will do; and taught Dessault himself, and proved to the profession, how great a proportion of those who are trepanned would live without the help of surgery: for many recovered after lying long in a state of stupor, accompanied with symptoms every way alarming, such as would, in any other circumstances, have induced Dessault or any surgeon to have trepanned.

But Dessault, who was too much inured to bloody scenes to fear operating, and too indifferent to the reputation of being an operator to feel any thing of the passion for cutting and trepanning, tried, for the first time, the great and important experiment of leaving his patients, having fractures and depressions of the cranium, at quiet in their beds. Among others, one Joseph Gautier's condition was in every sense interesting, but especially in the slow absorption of that general suffusion of blood, which we must presume to have taken place in the brain after so violent a concussion as he seems to have suffered, and the gradual recovery of his senses, proportioned in all likelihood to that absorption, and accompanying it step by step. " Joseph Guatier, a hale young man, twenty-three years of age, was found in the morning under a window, which he was accustomed to scale when late abroad, lying in a state of stupor, and bathed in his blood, which streamed from his mouth and nostrils, and from his left ear. When he was brought from his village, a few miles distant from Paris, into the Hotel Dieu, he was still bleeding from the mouth and nostrils, and insensible; the body cold, the face deadly pale, and the pulse small and contracted. On his head were many marks of contusion; and one over the lower and fore part of the parietal bone, was accompanied with a depression, deep in the center, and rising towards each side. The clavicle, which was also fractured, being set and bandaged, the head was wrapped in a large poultice: next day he was better; the poultice was continued, and he was bled in the foot; and in the evening his senses in some degree returned. On the sixth, he began to articulate, but indistinctly. By the seventh his senses were restored; his taste, smell, and touch were perfect, but his vision somewhat impaired: he heard also imperfectly; and, in respect to his intellect, the faculty of memory seemed much weakened; he could by no means recollect whence he came. He had no pain: it was on the tenth day that he first rose and walked: On the fourteenth, he walked abroad upon the bridge, and took his airing there daily, till the twentieth, when, the fractured clavicle being re-united, the bandages were undone. His memory mended daily; his hearing became more acute; his eyes gained strength, but still the pupils remained dilated somewhat wider than in the natural state, and the scull remained manifestly depressed. On the twenty-seventh, he was carried into the hall at lecture, and shewn to the pupils: this was before he was dismissed. At the end of three weeks, he returned to show himself, his senses being entirely restored, and his memory per-

fect: the pupils of his eyes had recovered nearly their natural smallness, except that the pupil of the left eye continued a little wider.

In this case, when about the third day, the bumpy swelling and ecchymosis began to subside, they felt the fracture and depression very distinctly, the fracture being of a circular form, about two inches and a half in diameter, with one edge more raised than the other; and after his recovery it was still more plainly felt.

" * The invariably fatal consequences of using the trepan in the Hotel Dieu deterred Mr Dessault from using it on this occasion; nor had he any reason to repent of his resolution." Even when the depression seems to produce the worst signs; when the patient bleeds from the nose and ears, and lies insensible; when his senses are not merely stunned and shocked, but so materially injured that they recover slowly, it is safe to leave the depression untouched: to trepan where there are no such signs would be destruction. Mr Abernethy " had a man brought to St Bartholomew's, who was hit on the forehead with a brick: The frontal bone was fractured half an inch above the orbit; the fracture measured two inches in length, and the upper portion of the brow was depressed about the eighth of an inch. *He was not even stunned by the blow, and walked to the hospital without assistance*, complaining only of soreness in the wounded integuments. He was bled; was confined, much against his inclination, to a scanty and liquid diet, and was purged every second day. This patient did not experience any illness, and the wound soon healed." But had Mr Abernethy been a surgeon of the complexion I have sometimes ventured to describe; had the patient been confined, much against his inclination, *to an operation-table*, and *trepanned*, there is little doubt I think how it would have fared with him.

But this is the difference betwixt the proceedings of a man of sense and experience, and a man of theory. There has been too much of surgery! A master in surgery can look, calmly and composedly, on that depression upon which a novice would instantly fasten his levers; he can see the scalp whirled off from both

* Journal de Chirurgie, tom. 1. p. 20.

sides of the scull *; the parietal bones laid bare; the temporal and frontal bones also denuded; *part of one of the bones beaten in, for an inch in length*, and more than the eight of an inch in depth, and a fracture extending downwards to the basis of the scull,—and yet refrain from trepanning. He can see a fracture similar to this, with a part of the bone depressed *even a quarter of an inch below its natural level*, without thinking of making an effort to raise it; and can even see the boy sicken on the third day, with headache and disturbed sleep, with dozing and

* "A lad, seventeen years of age, had his head pressed between a cart-wheel and a post; by which accident the scalp on both sides was turned downwards, so as to expose the lower half of the parietal bones, the squamous part of the temporal, and also part of the frontal and occipital bones; about a quarter of the cranium being thus denuded of its coverings. The periosteum was in several places stript off from the scull, the scalp much bruised, *and the posterior and inferior angle of the left parietal bone was beaten in.* The depressed portion, which was visible, *was an inch in length, and more than the eighth of an inch below the level of the cranium*; but the fracture extended along the squamous part of the temporal bone, towards the basis of the skull: it could not, however, be traced, as the temporal muscle had not been removed from that part by the injury. The scalp being cleansed, was replaced, retained in its situation by slips of sticking-plaster, and a slight pressure by bandage was applied. *The boy was perfectly sensible, his pulse regular, and not quickened.* He had bled considerably from the temporal artery, which had been divided by the accident: eight ounces of blood were, however, taken from his arm; and some purging medicine was administered next morning, which procured three or four stools. The next day (Friday) his pulse beat nearly 120 in a minute; his skin was hot and dry; and he complained of pain in his forehead. Twelve ounces of blood were taken away, and four grains of pulvis antimonialis ordered to be given three times a day. On Saturday, the former symptoms still continued, and were rather increased. The antimonial powder made him sick, or at least increased his disposition to be so. Fourteen ounces more of blood were taken from him; the vibratory feel of his pulse not being altered until that quantity was taken away: the blood, on standing, appeared very buffy. His skin, notwithstanding all this, still remained extremely dry; some antimonial wine was given, which produced vomiting. On Sunday, his pulse was evidently lowered by the evacuations he had undergone, but it was still quick, and sufficiently strong. The pain of his head remained as before. Having a sufficient number of stools, and the sickness still continuing, the antimonial powder was omitted. He was bled, however, in the vena saphena, and his feet and legs afterwards immersed in warm water; during which, he, for the first time, perspired copiously. A blister was also applied to his neck.—The scalp united, with only a trifling suppuration over the fractured part of the bone; and to this ready union, the lowering plan, by preventing inflammation, seems very materially to have contributed. The matter collected over the fracture was discharged by a puncture, and the boy got well.—*Abernethy.*

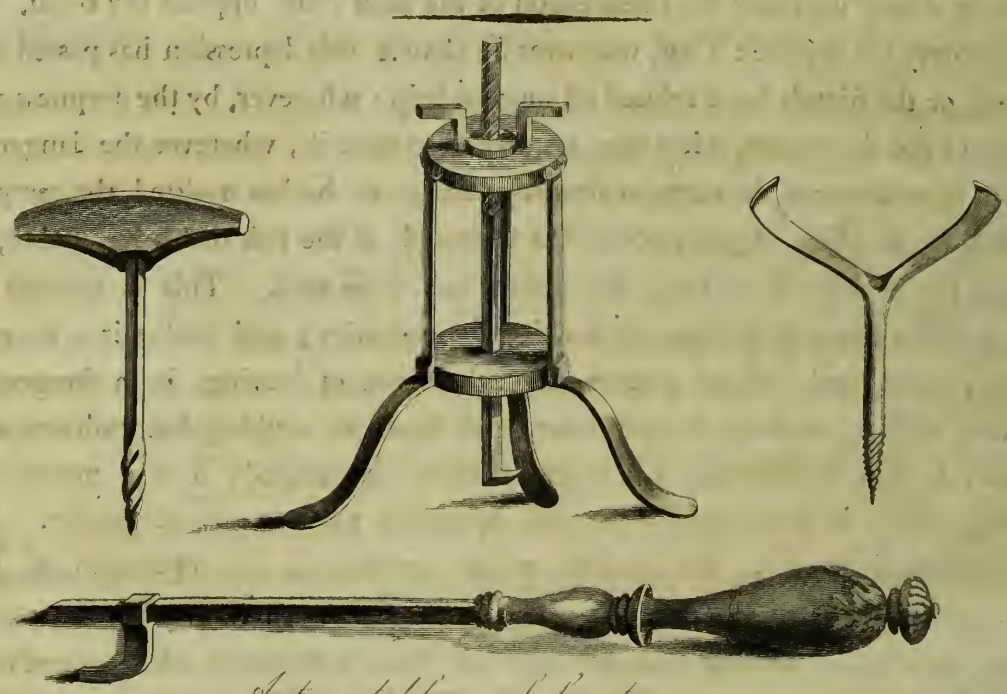
a slight convulsion, without being moved to do any thing rash or unbecoming *. While the tyro, just sent out from the schools, makes diligent inquisition into all the circumstances of a fracture, will allow not even a capillary fissure to escape his jealous search; and, where there is hardly any visible fissure, imagines such internal damages as may entitle him to "set to work with his instruments," and perform that great operation, which is to be the pride of his future years, "boasting of that which is his shame."

It is not honourable to our profession to have it thus proved, that while the opinion is almost universal that depression of the scull must oppress the brain, the fact is entirely the reverse: That, wherever by chance such depression has passed unobserved, or the friends have refused all surgical help; wherever, by the deepness and firmness of the depression, it has been impossible to raise it; wherever the danger of infection have deterred the surgeon from operating, or he has resisted the temptation, and, by an effort of good sense, has ventured, at the risk of his reputation, to disregard the established maxim, the patient has done well. This is enough to throw a doubt upon all that has been doing for centuries; and makes it a duty to tell you plainly, and without reserve, that the desire of leaving, in a dangerous operation, nothing undone, is not wise, and leads to nothing but rashness and violence: It is a prejudice so natural that it should be resisted; it is a manner of reasoning, which is worse applied to this operation than to any in surgery. To leave a Second Stone in the Bladder, while performing the operation of Li-

* A boy, about twelve years old, received a kick from a horse in Smithfield, which stunned him; and he was immediately brought to the hospital. The integuments of the forehead were divided by the injury, and the superciliary ridge of the frontal bone depressed *at least a quarter of an inch below its original level*; the depressed portion *measuring about an inch and a half in length.*

It is obvious that the bone could not be thus depressed, without a fracture of some part of the basis of the scull occurring at the same time, on which account the case might be considered as more dangerous. *In less than two hours he had recovered from the immediate effect of the blow, being at that time perfectly sensible.* Fourteen ounces of blood were taken from his arm; his bowels were emptied by a purge, and saline medicines, with antimonials, were directed to be given. He went on tolerably well for two days, at the end of which time, evident symptoms of considerable irritation of the brain took place. He now complained of pain in his head; slept little; and, when dozing, often started, or was convulsed in a slight degree. To remove these symptoms, he was bled twice, took opening medicines occasionally, was kept quiet, and without light, and was allowed only a spare diet. By continuing this plan for about three weeks, he perfectly recovered.

thotomy, is to do nothing: to leave diseased glands in the Axilla, when extirpating a cancerous breast, is to do worse than nothing: But to leave a *slight* Depression of the scull, even when the patient is stunned and sickened, or *any* depression where there are no bad symptoms, where the integuments are entire, when the patient is young, is to make a just and modest sacrifice of our wishes and prejudices to the safety of our patient.



Antiquated forms of Levators.

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EXCEPTIONS

To the General Rule of Leaving DEPRESSIONS *to* NATURE; *or* DEFINITIONS *of those* CASES *which actually require the use of the Trepan and Lever.*

I KNOW not whether I have persuaded you, but I have myself, to the most entire conviction, that of all the injuries of the scull that which is the most dreaded, viz. depression, is the least hurtful. I have seen such happy recoveries, where the depression was left undisturbed, such melancholy scenes when depression was raised at the expence of large perforations, and extensive openings of the scull,

that I confess myself very indifferent to this kind of danger, and very doubtful of the propriety of such operations: The practice which I think so very hurtful, it is my duty to oppose; and I shall now endeavour to keep my promise with you, of explaining, first, the general rule, so as to give you confidence, viz. "That you are not to trepan nor elevate every depression: and, next, "the exceptions, so fully as to prevent you, while you avoid the fault of hurry and impatience, running into any fatal error from neglect." You will find that I have considered these exceptions seriously, and that I retrace my opinions on this point to observation and experience.

First, The general principle which I have laid down is illustrated, and, I believe, proved, by this figure, (Fig. 1. sheet 1.), where *a*) represents the point from which a fracture of the parietal bone is bent down; *b* the natural level of the scull; (*c*) the extent of the depression, deep and formidable when seen and touched outwardly; but the space betwixt (*b* & *c*) demonstrates how very little the depressed bone is off its level, how partial and trifling the pressure must be, how slight an intrusion this is upon the convexity of the scull; and the truth which this plan demonstrates as probable is proved beyond a doubt, since, under the most extensive depressions of the scull, the patient preserves his senses. Nothing is more essential than that you should have clear conceptions of the motives for applying the trepan: it is one great point gained, to say with confidence, that "this of depression is not among the number." I never saw depression occasion stupor, nor the elevation of it bring relief; but many times when the surgeons have been busy, in a mob, struggling and elevating depression, in a manner almost as rude as that of O'Haloran with his four levers, the boy or man have been struggling, remonstrating, and making every kind of resistance *: Nay, it is most singular,

* There are, in my recollection, no cases, and I find in my readings very few, in which the depression seems to have occasioned stupor, or the elevation of it given relief. The following observation from La Motte is perhaps worth your notice as much as any.

"A boy (says La Motte) was rode over by a young prancing horse, which pranced upon him. There was a great wound, and much bone naked; and besides there was a considerable depression, apparently made by the cauker or heel of the shoe. This boy I found lying upon his back, crying out continually that he was falling, that he was falling down! I trepanned, introduced the levator, and raised the depressed bone. This boy, while the bone continued depressed, had continually the feeling of a drunk person, of the room running round with him: But the moment the bone was raised, *and the extravasated blood evacuated*, he recovered his senses." P. 320.

and not to be found in any equal number of injuries of the head of any other complexion, that, in all the instances of deep and wide depression which I have just quoted, or have yet to quote, the patient was sensible.

Secondly, Though this general principle cannot but be acknowledged, it remains to be circumscribed by certain definite rules: As we should take different measures in a clean cut of the integuments, and a rude and mangled wound, where the parts were bruised, lacerated, and unfit for adhesion, we must take various measures in fracture of the scull, according to its peculiar circumstances; and as there are circumstances which are found to prevent the adhesion of wounded integuments or wounded scalp, there are many which will prevent the healing of a fractured scull, and cause it to inflame the bone, and affect the dura mater: These are the exceptions, and they must be defined, and it is for this purpose that I have sketched the plan, (Fig. 2. sheet 1.) representing that kind of depression which I judge to be safe. It is not by present pressure that fracture is dangerous; therefore, when it runs in a right line, when there is a general depression, but no particular point forced in upon the brain; where the declination of the depressed from the sound part of the scull is gradual and uniform; when the whole line (*a b*) is generally depressed, and the central point (*c*) sinks deeper; though you can feel the hollow with your finger, and can see it (not without apprehension) when the coagulated blood is discharged; yet as the center (*c*) does not intrude upon the brain, as this point does not dip so as to present points or spiculae to the dura mater; as there is no rough edge presented on the inward surface, nor any rude shock, like that of a ball, to deprive the bone of life and prevent its healing; as it is broken by such a force as fractures other bones, and is surrounded (as marked at *d*, fig 1.) with a mass of cellular substance, thickened by inflammation, and by the injection of blood into it, such as reunites other fractures; the scull, pericranium, and dura mater, all mutually adhere, and the effects of such depression are never felt.

Upon every principle, and every precedent, we are bound to commit such a case to nature: it daily happens that boys have the forehead thus flattened by the kick of a horse; sometimes dangerous spiculae, as where the caulkers of the shoe have pierced the bone, are cut away, and very properly, with the trepan: sometimes, too, the bone is elevated; but very often it is left untouched, the wound lightly stitched, and dressed dry, and the parts re-unite and heal as in any other wound, a visible, but harmless, depression remaining. While the integuments are

Plans and Drawings of Fractures and Depressions of the Skull.

Sheet 1st

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Fig. 1.

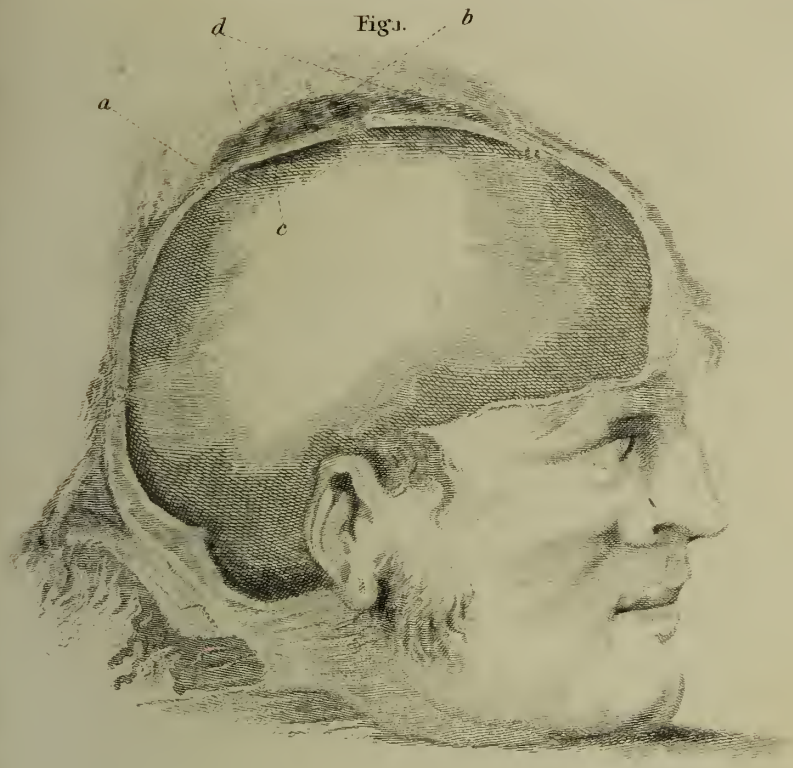

Fig. 2.

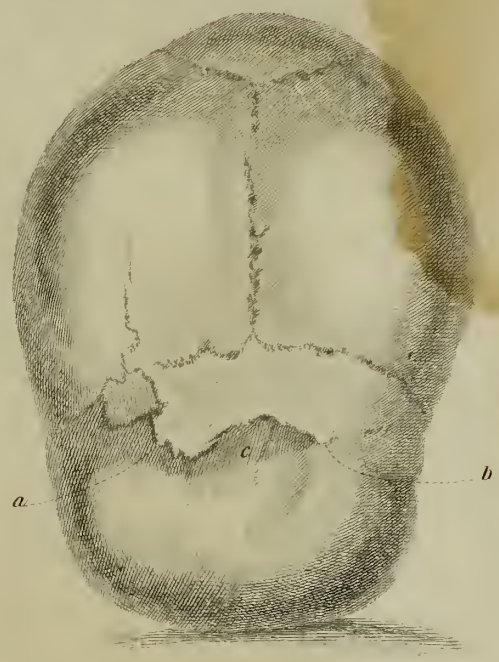

Fig. 3.

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Drawn by C. Bell

Engrd by B. Mandel Sc.

entire, the inducement to leave them so is particularly strong; when left entire, the consolidation of the parts, and the absorption of the blood, is certain, or almost so: to open it, is to convert a simple into a compound fracture, with every danger of its not healing favourably. I remember to have put in my finger, through a wound in the scalp, and felt, in a very old woman, near 70 years of age, a depression of the parietal bone of two inches of extent, the fracture wide, the edges rough, and the depressed bone apparently driven far below the unhurt part of the scull; and the only notes I have taken of the case are, that she never passed one sleepless night, nor had one hour of sickness; her appetite never declined; that she sat up to be dressed, and kept her bed a few days only, through precaution rather than for want of spirits or strength, and recovered as from the most ordinary wound. In those less advanced in life there is less danger; and we have the best authority (the authority of those whose general practice is to use the trepan) for affirming, that in such cases, not only the present depression does no harm, but the fracture unites, and the wound closes; the patient may even be seized with shiverings, and the part with suppuration, (strong reason for suspecting a carious bone), yet such abscess, being punctured, will discharge "a considerable quantity of matter," and the patient be in no danger *: Nay, we are assured, on the same

* "Mrs Grogan fell from a window into the street, and received a violent contusion on the front of the coronal bone. I saw her the next morning, and found a considerable tumour, which to the touch seemed to contain some fluid; but as I had seen many similar ones subside in four or five days, by the use of compresses wet in spirits, I treated this in the same manner. The swelling, however, remained, and in five days I proposed opening it, which she would not permit. The sixth day she again sent for me; the tumour was still the same, but the fluctuation not so sensible. I laid open the part, and a good deal of coagulated blood was discharged. She complained all that and the next day of pain, and a thin bloody sanies came from the wound. *I found not only the bone bare, but a considerable fracture, with some depression.* I pressed with my finger the sides of the bone, but it remained firm to the touch, and she felt no uneasiness from it. I kept the wound open for some days, and finding no alarming symptoms, suffered it to heal, which it did by the end of the month. I recommended her to keep the part covered for some time, on account of the thinness of the cicatrix. This she neglected. In some days after, leaning over a garden wall, with a smart wind in her face, she was seized with a violent pain, and imagined the wind was piercing into her head. She slept little, and was the whole night in a fever. Next morning, I found *the forehead greatly swelled, and let out a considerable quantity of matter.* In some time it got well; she had it covered with adhesive plaster, and never after complained."

impartial testimony, that a bone loose and somewhat depressed will fix again*. But in boys especially, where depressed bone has in general no sharp edges; where the scull rather bends than breaks; where the bone is vascular and growing, and the circulation in it and in the integuments sound and vigorous, the chance of fracture healing is so great, that I would not presume to touch it, unless in most peculiar circumstances; especially as in boys the dura mater is too tender to serve as a second scull to sustain the pressure of the circulation within the brain: wherever it is necessary to make large openings in the cranium of boys, protrusion of the brain and death ensue.

It is not then the present but the remote consequences of depression we have to dread: a depressed is more apt to become CARIOUS than a direct or linear fracture; and it is as a fractured Rib or Sternum inflames the Pleura or Pericardium, that depressed fracture of the scull by becoming carious inflames the brain. This is an *accident* which may happen in any form of fracture, where the bone is but laid bare, or scratched, or punctured, as well as where it is depressed; it is one for which the surgeon, who has endeavoured to reunite the fracture, can be no more blamed than he could be blamed for an extensive suppuration of the scalp, where having stitched the lips of the wound lightly and nicely together, and taken every pains to prevent suppuration, it had yet suppurated; but it is an *accident* so frequent, and indeed so much depending on peculiar forms of fracture, as to occasion a variety of exceptions to the general rule.

Thirdly. The first exception which I would explain to you, is not of this nature, but depends on other concomitant circumstances. A fracture, with or without depression, may be of such extent as to indicate great violence, the concomitant symptoms announcing extravasation: The fracture traversing the channel wherein the great branches of the arteries of the dura mater are lodged, they are often lacerated, and pour out much blood, which may be actually seen oozing through the chinks of the fracture, and in such circumstances it is our duty to operate: but then our sole motive for operating is to relieve the brain from

* "Samuel Haste received a wound on the upper part of the right parietal bone, of two inches long, *with a loose bone and fracture.* Though the fracture could not admit of a doubt, yet there seemed to be but little depression, and the sides of it were firm to the touch. I saw no reason for the operation at present, but carefully attended to the symptoms. In the space of four weeks the bone became covered, the wound healed, and he has since enjoyed perfectly good health."—*O'Haloran.*

the blood which oppresses it, not on account of the fracture, which only marks the place of the chief violence. Figure 3. may represent such a fracture; where (*a*) marks a wide fracture (through which the black blood is seen) running down into the orbit, perhaps into the basis of the scull; (*b*) two other limbs of this wide and gaping fracture, running down along the temple, and backwards through the parietal bone; (*c*) represents a large corner of bone depressed, apparently loose, and so surrounded and insulated by the various chinks of the fissure, that you would believe, first, that it would be easily removed if that were reckoned prudent; secondly, that it must be perfectly easy to elevate the slight depression of a bone so insulated; thirdly, you would be naturally inclined to fear that such a bone could not have sufficient circulation to live: but all this is deception, a very common deception; for such a bone is steady, immoveable, cannot by any force of the levator be elevated, and lives, and granulates: (*d*) marks the trepan circle which should be made in these circumstances, and the piece of bone being sawed through and picked away, the half-coagulated blood rolls out as black as pitch, and the patient is relieved and finally saved.

This represents in truth the head of a very stout sailor lad, who, in going out upon the main-yard, to get in the studding-sail boom, fell clear from the height of the main-yard: no stay nor tackle broke his fall; he had not a wrist nor any part pained or bruised; he lighted full on his forehead, which bore the whole force of the fall, and, by hitting a cat-head, (a solid projecting clump of timber, round which the tackles are secured) his scull was fractured with deep and wide rents, running downwards towards the basis, in every direction. This happened on Sunday evening; he was immediately carried down to the cabin, and lay long insensible, and when he revived, found himself cold, giddy, sick, and powerless, and continued to vomit for some hours.

On Monday, when I saw him, there was no delirium nor confusion of intellect, night nor day; no faultering of the tongue; no dilatation of the pupil; no sign nor degree of palsy in the left side, and the vomiting had ceased: He complained of nothing but of indescribable suffering in his head, and a sort of oppression and misery during the night; yet his condition was very decidedly marked by a sign, which I have seldom found deceive me, a slowness and marked intermission of the pulse, which, throbbing slowly and heavily, pauses at every fifth or sixth beat. The wound in his forehead was right-lined, of small extent, about an inch and a half; not mangled nor lacerated; the lips not puffed up by extravasation, but sim-

ple, as it had been made with the blow of a pocker; and through this wound the probe, passing obliquely, discovered a slight depression, a rough edge of bone, and wide fractures, through which the buttoned point of the probe might have passed. His condition was singular: He was a big and fleshy lad; and, from the steadiness of his posture, the sluggishness of his motions, the manner in which his limbs were folded, and the slow and oppressed way in which he spoke, from the slowness of his breathing, together with various indescribable circumstances, one felt, while standing over him and rousing him to answer questions, as if conscious that he lay heavy on his bed *. His answers, even to the most curious questions, were circumstantial and correct; but they were extorted by urging him to reply: his answers to each question were delivered slowly, after drawing a long breath, and with an oppressed sigh. He seemed to feel great oppression at the scrobiculis cordis: his head always dropped upon his breast; and his hands, when you raised them, dropped heavily by his side. You were conscious of the pain it gave him to renew a conversation, by the slowness and sighing with which he began his replies: he lay still, oppressed, breathing slowly, with deep inspirations, and he had a corresponding pulse, for it throbbed slow and heavy, beat just 50 in the minute, and at every fifth or sixth throb, it paused distinctly the space of one slow pulsation.

His suffering during the night, he said, was inexpressibly great, but it was such as he could in no shape describe. He was told how doubtful his condition was, and how likely that we should advise him to submit to an operation: After passing one night more in this oppressed condition, he allowed us to elongate the incision, making at the same time a crucial one, by which these terrible fractures (fig. 3.) were displayed; but the inner surface of the flaps of skin was so exquisitely sensible†, and he was so far from feeling all his misery, that he insisted upon being carried to bed.

* I do not scruple to copy expressions of this inaccurate kind from my Case-book, when I find them, however incorrect, to be suited to convey those lively impressions which one has only in the moment of looking upon a patient.

† I cannot but mention here with approbation, the thin plates of iron used by Mr Croker King, as Defenders. I have often seen much crying and struggling, severe and indecent violences used, the operation much protracted, and conducted altogether in a manner which must have shocked every spectator, from the want of them. Something of this kind should be in every trepan case; this mea-

But, two nights more of that indescribable suffering, which he had tried to express to us, quite subdued him: He said, "Whatever we pleased to do with him, was now welcome." The flaps of scalp were now, on Thursday, in a state of suppuration; the black blood was, at the time of incision, distinguished through the fissures; and upon the circular piece of bone (*d*) being cut with the trepan, rolled out in large clots. I could feel a great hollow betwixt the scull and dura mater, which was depressed by the extravasated blood, and the probe pressed along unobstructed for several inches, in every direction, from the trepan hole. To talk of repeating the perforations till an extravasation of this extent were uncovered, would be to think like a school-boy: the process was in this case simple and uninterrupted. The patient's anxieties and oppression were gradually relieved. He was trepanned on Thursday; on Friday he felt quite relieved; on Saturday, his slow, throbbing, and intermitting pulse, had risen from fifty to eighty in the minute; and at each dressing the blood diluted with a sort of serous exudation from the surfaces melted and flowed out. At the first dressings, I made way for its flowing out more freely, by introducing the probe, wrapped in oiled lint, and moving it gently round betwixt the scull and dura mater; and as the dura mater rose, which it did visibly from day to day, it assumed a vermeile colour: the scalp, bone, and dura mater were, in course of a fortnight, one undistinguished mass of red granulations; the process of healing was rapid and uninterrupted, not even interrupted by the loosening of a small piece of bone, which was partly cut by the trepan and partly insulated by the fracture, and which I picked away, without the help of forceps, with the probe. I find that, on the Sunday following, I had been obliged to turn out large clots of blood with the probe, which presented at the trepan hole, and extended far under the scull; and that, on the following days, I was occasionally obliged to use the syringe, with tepid milk, to wash out clots.

Fourthly. Yet you must perceive, that it is not in such cases, that the gaping fracture, or even the excessive depression, that is an object of concern, but that the extravasated blood is at once the cause of the danger and of those signs which denote its existence; and those signs of extravasation may be so decisive, especially when conjoined with fracture and depression, as to induce you to cut open the integuments and perforate the scull, as in figure 4. This sketch, figure 4. represents the

sure of precaution prevents one of the most meritorious and necessary acts of professional cruelty from both appearing more barbarous, and being actually more painful, and less easily accomplished.

head of a fine sailor boy, of about fourteen years of age, spirited, active, and very thoughtless. While the vessel was unloading, he tripped in skipping about the deck, pitched headlong into the hold among casks, and was carried up into the air in a state of stupor, bleeding from the nostrils and vomiting. There was no external wound, but a universal extravasation of blood into the cellular snbstance of the scalp, especially over the right eye-brow, by which the eye was almost closed. It was some time before he was removed from the ship in the roads; and when I first saw him, it was easy, through the integuments, swelled as they were, to distinguish fractured edges, and a depressed bone; but the extent or form of these could not be ascertained, and indeed they never should have been with me a motive for making incision into the swelled scalp, but that he lay still in a state of stupor, vomiting, and bleeding from the nostrils: his stupor was not the deadly snoring of the apoplectic state; it had the peculiar character which I have just attempted to delineate: He could be roused, was sensible and rational when excited, but still he was in a state of stupor, into which he instantly relapsed. Generally the removing the patient to an operation-table, and almost always the first incisions, excite the patient, though delirious, he becomes rational, though torpid, he is roused; yet still, even when thus roused, his actions bear the character of stupor or delirium. This boy, when carried to the operation-table, was roused to a perfect consciousness of every thing around him; and, when the operation was done, said, "I think I have borne it with spirit."

This boy then was perhaps a fit subject for the experiment of trying, how far the powers of Nature might prevail, in at once supporting the system under oppression, healing wide fractures, and absorbing much extravasated blood; for while there was such extravasation outwardly, along with conspicuous fracture of the scull, there was great probability, almost a certainty, of extravasation within. It was an experiment I did by no means feel myself intitled to make; because, the stupor, the vomiting, the haemorrhagy from the nostrils continued: I therefore made an incision into the tumor, a long incision, which, directed by what I felt without, uncovered a long fracture, the circumstances of which are represented in this sketch. The lower part of the forehead was more swelled with saggilation; the eye was more closed; the edges of the incision, when laid aside as here represented, were more choaked with coagulated blood than can be well represented in a drawing: the coagulated blood was also injected so into the cellular substance of the pericranium, that the fractures could be better felt than seen: but, one great fracture (*a*) running down the forehead, passed into the orbit, and was so very wide that it

Plans and Drawings of Fractures and Depressions of the Skull.

Sheet 2.d

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Fig. 4.

Fig. 5.

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easily admitted the handle of my scalpel: the other limb of the fracture (*b*) run round in the direction of the coronal suture; the whole piece and corner marked (*c*) was deeply depressed, and so far locked under the edge (*d*) that it was necessary to make those two perforations, and to cut off a small projecting corner with the finger-saw, before we could think of using the lever. The blood rolled out through the first perforation. The depression of the dura mater by the blood was as great as in the former case; the circle in which, I could with the probe feel it detached, was as wide: The rising of the pulse, which had been oppressed; the recovery from the stupor; the granulation of the dura mater, and the closing of the wound; and the daily issue of clotted blood, make this, in all respects, a just parallel with the case I have just related. The extent of the wound was such, that the boy was not dismissed till the 9th of January, the 7th of September being the day of his fall: But what surprised and gratified me was this,—The piece of bone marked (*c*), which had been depressed and elevated, actually moved with each pulse of the brain, so loose did it lie upon the dura mater. I feared, when I saw the dura mater through the trepan holes, red and granulating; when, on the 20th day from that of the operation, I found also all the exposed part of the scull covered with a fine and florid pile of granulations, this triangular piece of bone excepted, (which continued yellow, quite bare, and still moveable), that it must become entirely carious, and exfoliate; and that this, by protracting the cure, or, by its exposing the brain, might bring the boy into new danger: I had this impression on the 30th of November, and marked it in my daily report; but by the 6th of December, the same pile of florid granulations had crept along over the whole surface of this portion of the scull, and by the 14th the whole wound was cicatrized.

Such wide and gaping fractures, then, imply a very heavy blow, or a fall from a great heighth: I find them often accompanied with deep apoplectic stupor, with palsy of one side, dilated pupils, and involuntary stools; with groaning and sighing, an uneasy tossing from side to side in bed, as if from oppression, and a frequent raising of the hand to the affected side of the head.

Fifthly. There is a kind of danger inseparable from certain forms of depressed fracture, which no experienced surgeon will despise. The fracture, No. 2. sheet 1. flat and even, having no particular point depressed, causing no stupor, and attended with no ill signs, is by no means a fit subject for operation: but, where (as in sheet 2. fig. 2.) the fracture is radiated and pointed, where the bones

do not "lie pashed or loose upon the dura mater," and yet are much shivered; where not a long flat edge is driven under the sound bone, but particular points are depressed, presenting probably on their inner surface spiculae and irregular and jagged edges, there is imminent danger, not from the depressed bone lying heavy upon the brain, but from its points pricking the dura mater, whence, on the eighth or tenth day, inflammation extends from the membrane to the brain, shiverings and tremors come on, and the patient dies: Not the long and wide fracture (*a a*, fig. 2.) nor the general depression produced by the yielding of the three triangular portions (*b*, *c*, *d*.) are the cause of danger, but the dipping in a more perpendicular direction of the point (*d*), which, being central, has received a great proportion of the force, and which, by being driven deeper than the lateral parts (*b* and *c*), is likely to carry down splinters from the inner table of one or both these portions: It is because the scull consists of two tables, and not by the peculiar fragility (though it is more fragile) of the inner table, that points and spiculae of it are so apt to be driven into the brain: when the pointed portion (*d*) is driven below the level of the contiguous parts (*b* and *c*), it leaves behind it the outer table of each of these portions, but it passes the inner table, and, as it is driven inwards, every inequality, or angle of the fracture, makes a resistance by which splinters are not only carried before the point (*d*), but driven vertically, like pins or sharp wedges, through the dura mater. The experienced surgeon distinguishes at a glance the forms of fracture in which there is danger of this kind: and, in a fracture of the form here described, *radiated*, *pointed*, *and depressed*, as there is no room betwixt fragments lapped over other, like fingers when plaited and squeezed together, to admit a lever, I think it right to apply the trepan at the angle (*e*), (as usually there is such an angle in every fracture of this species), through which the lever, being introduced under the depressed points, raises them, and the probe, being turned round within the scull, will ascertain whether any rough edges still present, or whether any spiculae or dangerous points stick in the membrane.

Fifthly. Fractures of this form may prove dangerous, but depressions of the kind which I am next to describe must be so. The form of depression represented in sheet 3. fig. 6. is such as happens when a man is thrown from a stumbling horse, and pitches with his head directly against a stone; or when he falls from a yard-arm, for example, and pitches upon the deck; or when a block and tackle, or a cornerstone from a building, falls directly upon his head. This fracture is described by

Plans and Drawings of Fractures and Depressions of the Skull.

Sheet 3d.

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Fig. 7.

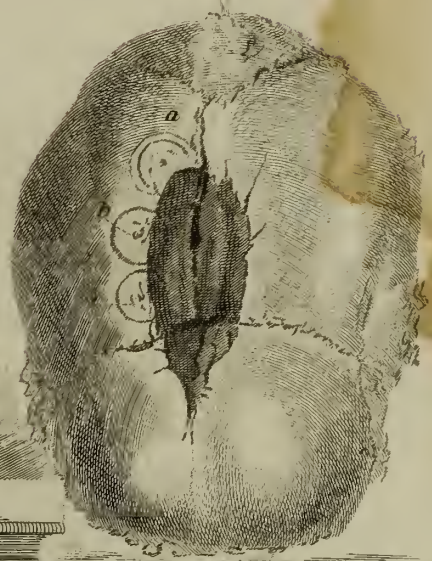


Fig. 14.

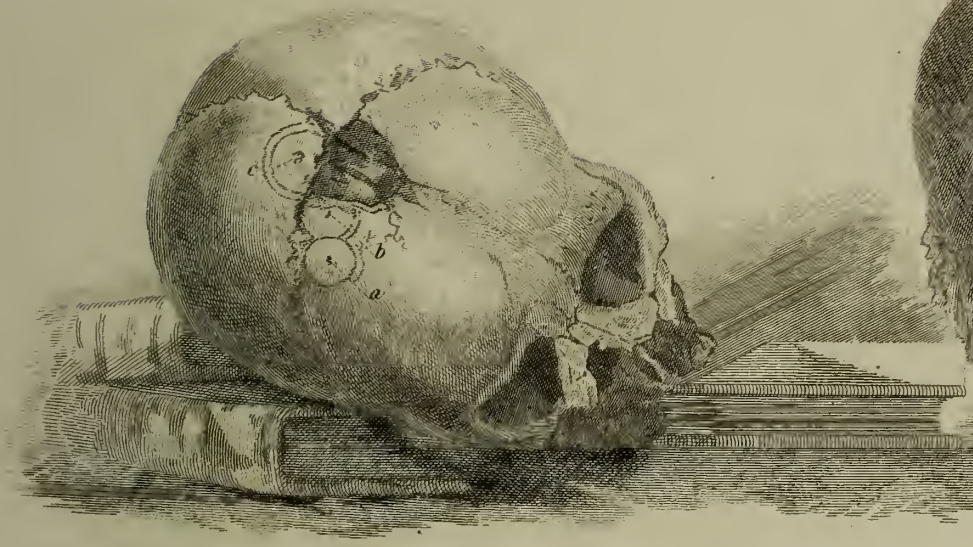
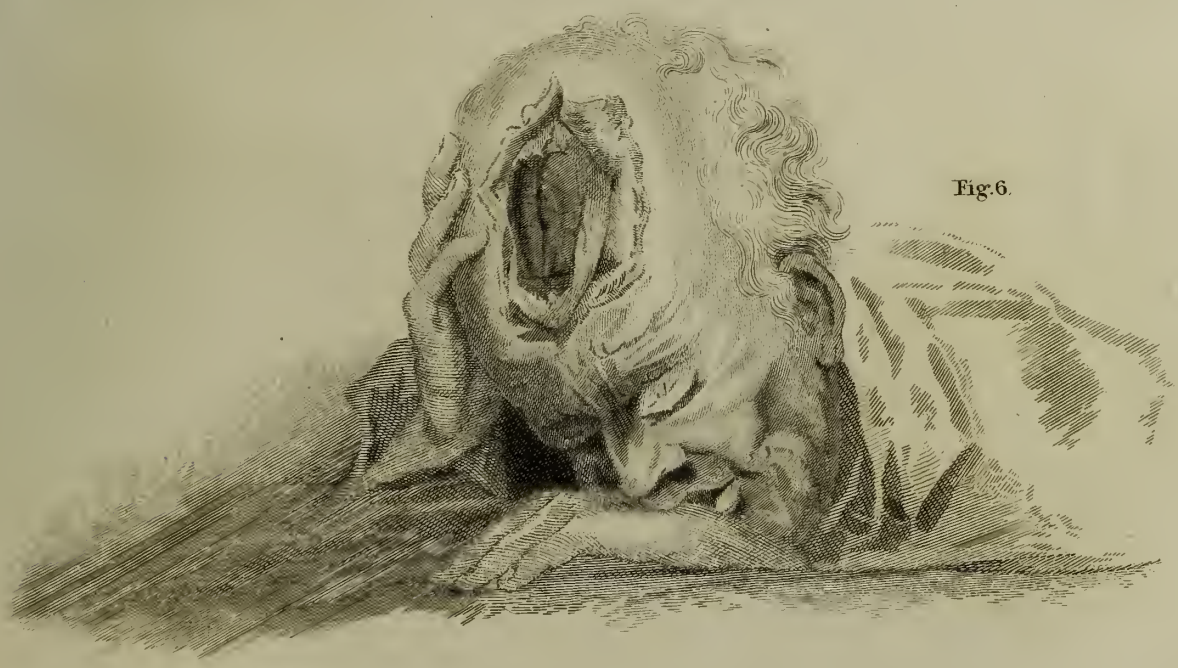


Fig. 6.



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the ancients under the title of *Cameratio*, the camerated fracture, as resembling the inverted tiles of a house; the center is depressed in a direct line, the sides decline towards that center, like the form which the two hands make when laid together edgeways. The form of this peculiar fracture has been but too minutely described; while its character has been less an object of attention, though, from its very form, these inferences are plain: First, That in consequence of its great extent, both lengthways and from side to side, the oppression of the brain, if such an effect could be produced by depression of the scull, should be most manifest; yet I affirm, from experience, that such effect is rarely felt, and shall prove, at the least, that oppression of the brain is not inseparable from this kind of depression: Secondly, I shall prove, That from the depth to which the central line, or direct fracture, is depressed, there must invariably be presented two rough and very dangerous edges, which, by irritating the dura mater, will cause suppuration: Thirdly, That though the patient should escape this danger, the circular fracture or crack which surrounds the whole, and which must invariably accompany depression of this form, (without which indeed the bone, in an adult at least, could not yield), must almost always insulate the depressed pieces, they must in nine of ten cases become carious, and to prevent these manifest dangers, I imagine it to be clearly the duty of the surgeon to elevate and pick them away, by pressing in his lever betwixt the edges of fissures usually very wide; or, this being either impracticable, on account of the wedge-like impaction of the depressed portions, or dangerous from the dipping of one end of so long and broad a fracture, while the other is rising, he should apply the trepan in the manner represented in figure 7. applying successively the crowns of the trepan (*a*, *b*, and *c*.) till the bone can be raised without being turned in upon the brain.

The case, which I have selected for illustrating this principle, is that of an old man, of the name of Thompson, who might have been saved by a timely operation, but who was lost by delay. He had fallen headlong down a precipice, (the Calton), fractured his scull, had a depression of the depth and extent you see marked in this slight sketch, (sheet 3. fig. 6. and 7.) a double depression in the very course of the great longitudinal sinus and of the falx, which, if any thing could oppress the brain and disorder its circulation, should have produced that effect: but so slightly was he affected, that nineteen days elapsed without himself feeling, or his friends suggesting, the propriety of procuring assistance. At the end of twenty days, this was his condition:

The depression was manifest to the touch and to the eye; the whole extent of the bone was black and bare, and a pale granulated fungus surrounded it: he had never, from the moment of the accident, had one hour of sickness, or vertigo, or any considerable pain, but, on the twentieth, began to lose his appetite, became drowsy when undisturbed, and languid when forced to speak or move; his pulse was rapid and small, his nights were passed in confusion.—On the twenty-second day, he complained of more than usual pain, of slight vertigo, and of nausea; and these symptoms succeeding a night of confusion and delirium, in which he struggled often to get out of bed, made it necessary to perform straightway an operation so obviously necessary, which had indeed been resolved on, and delayed only by necessary arrangements. The crown of the trepan was applied twice, and through each perforation the lever was introduced, and the bone poised up, but could not be safely moved till the third perforation set it quite free, when all the blackened bone was taken away.

But long before the operation was performed, the fatal inflammation had begun; so it appeared from the depth and extent of the fatal abscess, which had indeed destroyed one entire hemisphere of the brain. Hitherto his state might rather be described by the term drowsiness than stupor: but the delirium of the night preceding the operation was a decisive and fatal sign. This delirium never ceased: in the present, as in all cases that I have watched, the symptoms were aggravated during the night: In suppuration of the brain, every long slumber is followed by a degree of delirium, and the fate of a patient, whose condition cannot be suspected from any symptoms occurring during the day, may be prognosticated from the confusion in which he passes the night. Through the night following the operation, our patient started up frequently, struggled to get out of bed, talked incoherently, but the return of light restored his senses, and during the day he was rational and composed, but still he slumbered. This was his condition during the nine days that he survived the operation: His pulse was a hundred and twelve, weak and variable; he was restless and confused during the day, especially after slumbering, and was delirious during the night: from the opening in the scull, there was a considerable oozing of blood and of bloody serum. The third and fourth nights after the operation were less perturbed: during the fifth and sixth, he was extremely restless and agitated, speaking much, and struggling to get out of bed: the dura mater appeared now black and sloughing, with a foetid, thin, and blood discharge. On the seventh, he became comatose; his cheek had a circumscribed and hectic flush; his pulse beat 120; there

Fig. 9.

Fig. 8.

Drawn by J. Bell.

Engraved by E. Mitchell Edr.

Drawing of the dissected Cranium of Thompson, whose Scull was Trepanned too late to save him: representing, first, The external Surface Fig. 8. having the Trepan Holes & a great opening made by the elevating the Carious Bone: & second, the internal surface Fig. 9. having part of the Ulcerated Brain still adhering.

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was no more delirium, he lay insensible, and passed his urine and faeces inconsciously: On the sixth, seventh, and eighth days, the coma became deeper; he lay still, and muttering; and, after slight convulsive rigors, expired, on the ninth day after the operation, the twenty-eighth from the time of his fall. In describing deep suppuration of the brain, to speak of the laxatives and draughts that are administered, or of their effects, were a very trivial detail.

The dissection of the scull and brain are represented in the Plate facing this page, where (fig. 8.) shows the external surface of the scull, the whole extent of the fracture and of the denuded dura mater being seen; where (*a*, *b*, and *c*.) denote the three circular incisions made with the crown of the trepan; (*d* and *e*,) the parts of the scull which had scaled off, rather by ulceration and caries than by the force of the blow; from (*f* to *g*) marks the extent of the naked dura mater, while (*h*) marks a large slit-like opening, an inch or more in length, caused by sloughing and bursting of the dura mater in the latter days of his existence, and through which the matter from the abscess of the brain flowed copiously. The whole of the right hemisphere of the brain was in a state of suppuration; the basis of the abscess was very large; the opening through the dura mater, as represented at (*i*) in figure 9. was like that made by a large abscess lancet, into the sac of any great tumour: the medullary substance of the brain was soft and gelatinous; the part immediately surrounding the abscess was gangrenous, marked by a black or leaden colour, extending an inch or more round every part of the abscess, and terminating in a disk or halos of a deep green colour: The left hemisphere was also, in a degree, tainted with the same colours and slightly ulcerated on its surfaces.

Seventhly. Punctured Fracture is that form of wound in the bone which has the same relation to these wide fractures and broad depressions, that the stab of a bayonet has to the cut of a sabre: plainly and indisputably requires the trepan, for in no case can we divine how deep the point may have gone; how far the ball, weapon, or point, may have sunk into the brain; in what degree or form the bone, especially its inner table, may be fractured: blood is often extravasated, and often spiculae stick in the dura mater, or in the sinuses: The present injuries are sufficient motives for applying the trepan, and caries is in this form of fracture almost inevitable. I hold it to be the duty of the surgeon in all such fractures to use the trepan; to place the center-pin of his instrument as close by the center of the fracture as its irregularities will allow; and to operate with a crown so large as to cover all the fracture, and cut it out at once. The sketches, (sheet 4. fig. 10. and 11.)

represent punctured fractures. Figure 10. represents that of a man who having, in a low tippling cellar, got into a drunken brawl, one Sunday night, was, by the man who kept the cellar, pushed backwards, (but without a blow and without malice), and his heel encountering a stool, he fell directly backwards, so as to hit the ear of a carron pot, and the point of it, entering deeply into the occiput, made a punctured wound, which you perceive might have been entirely covered and fairly sawed out by one large crown of the trepan; but the brain was so inundated with blood, from the splinters of bone transfixing the sinus, that he died, I may say upon the spot, in convulsions: he died betwixt night and morning, and before we could have matters arranged for applying the trepan: the immediate and first inquiry proved so manifestly that there was no malice, that no prosecution ensued. Figure 11. shows the star-like fracture produced by the ball, in the French Captain, whose case is narrated in an early part of the volume, whose life was in danger from that caries which must have come in process of time, who was saved by cutting out at once the shattered bone and flattened ball.

Such cases remind me of the necessity of establishing this as a rule, "That all punctured fractures should be trepanned," and of enumerating the general accidents by which they are produced *. When a man falls backwards against the sharp cor-

* The melancholy consequences are admirably depicted in the following singular cases, where the fracture was so minute that, had the integuments been fully opened, it might have escaped investigation; and yet the cutting out of such punctured piece of bone early could alone have saved the boy's life.

—— Brand, aged about 14, was struck on the temple by a pair of scissars flung at him, the point of which stuck a little above the external canthus of his eye, till it was pulled out. A bit of sugar tied on the wound by his mother stopped the blood. He complained little for two or three days; but the pain gradually increased every day after. However, he went about till the eighth day, when he fell into convulsions, and I was sent for.—There was a hard tumor under the pericranium and crotaphite muscle, so tense that a fluctuation in it could with difficulty be perceived. The tumor lay so exactly under the artery, that it could not be laid fully open without wounding the artery. To prevent an haemorrhage, therefore, I cut the artery and all through to the bone with a bistoury. About half an ounce of well-conditioned pus rushed out, by which he was greatly relieved.—When I thought enough of blood had been discharged, it was easily stopped by a dry dossil and a halfpenny in the compress.---Next day he was brought to town; and Dr Gilchrist ordered such internal medicines as were judged proper for him, and he continued easier for two or three days. After which the violent headache and vomiting returned and lasted two or three days more, when a large quantity of matter burst out from within the scull, which again gave some ease.---But, though the orifice in the integuments was enlarged, no further discharge could be procured. He died in a day or two

ner of a stove or grate; when, by the bursting of a fowling-piece, either the fragments of the gun-barrel, or the breech-pin enter into the forehead; when, by a blow from a hammer, from the keys of a crane swinging and hitting the head; when, by the blow of a sharp pointed stone, making a radiated wound of the scull, depressed in the center; when a splinter from a carronade, or bolts, nails, or other fragments of iron have, in a sea engagement, penetrated the scull; when a musket-ball, a dagger's point *, or the point of a pike or bayonet, stick in it—the fractured

after, being the sixteenth day after the accident.---On opening his head, half a pound of pus was found in the brain, and the hole in the scull made by the scissars would not admit the point of a pin.---His friends absolutely refused the trepan, by which he probably might have been saved. His death, however, was of use to others, who more readily submitted to the operation, upon seeing the fatal consequences of neglecting it in his case.

* In page 16 of Marchetti, there is an interesting case of a man who had been wounded with a dagger. "He was apparently cured, a sort of cicatrix was formed; but all was not sound below; for in about three months after, he began to have epileptic fits; and he had his fits about two or three times every month. Sala, who was in the consultation with Marchetti, asked him, whether he had ever had a blow on the head? He told the story. Then, a probe being introduced under a sort of scab, which was in place of a proper cicatrix, they found a fistula, leading to the bone. The opening was dilated with the knife. Next day the trepan was applied: a yellow ichor flowed out from the dura mater; it was filled up with florid granulations. In thirty days he was cured, and the epilepsy never returned."

"A few days before the battle at Worcester, while we were dressing the wounded soldiers, one was brought to us shot with a musket-bullet on the right side of his head. My servant Will. Clarke, now dwelling at Bridgenorth, in dressing his wound, felt the shot sticking deep in the scull. I hastened to him, and saw the man speechless. We laid the cranium bare by a circular incision, and permitted it to bleed: then passing in a levator, we raised up the bullet, and pulled out the depressed bones, with which there came away some blood, and a little of the brain. This being wiped away, there appeared a large wound in the dura mater. We dressed it with a sindon dipt in *ol. ros.* and *resina*, and filled up the cavity wish dossils of lint. Having so likewise dressed up the trepanned bone, we applied our digestives to the lips of the wound, with *emp. è bolo*, and bandage over all. Before we had dressed him up, he lifted up his eyes, and asked how he came amongst us. Several other things he demanded of us. We caused him afterwards to be removed, and continued our care of him. The wound did digest, and somewhat of the brain came away each day; yet his speech continued: But what became of him after our defeat, I do not know.---*Wiseman, p.* 148.

Bartholine tells us of a man in Pavia, who being wounded behind the ear with a sword, the point stuck in the bone. He remained at Pavia some months. It would appear that the surgeons had made many attempts, but surely they must have been irresolute ones, to take it out. He left Pavia: He died of it. But how long he lived with the point of the sword sticking in his scull, Bartholine did not know.

bone, and the fragment of the weapon or the ball, must be cut out with the trepan, else, slightly as the patient feels the wound, he will, by the inflaming of the bone and the suppuration of the dura mater, be irrecoverably lost, before the symptoms indicate danger. These are almost the only fractures in which I think the largest sized trepan should be used.

Shocking as the accident was, which I am now going to relate, I hardly ever saw a punctured fracture that I would so willingly have left to nature as that represented in the drawing, No. 12. which represents the scull of Billy Cameron, a boy of about twelve years of age. He was occupied a whole morning, with his little playfellows, in swinging upon an area door: The staple was loose; the insecurity of the door made a part of the pleasure they had in swinging upon it. When it came round to this little boy's turn, the stone in which the staple was socketed gave way; the gate of cast iron, the corner-stone, and the boy, tumbled all at once into the area: A good woman ran out instantly to lift the boy, and found him lying with his head pinned to the ground, betwixt two of the iron pikes, one of which had grazed and wounded the left side of the head, while another had pierced the scull, and was sticking in the parietal bone, the weight of the gate and the stone lying above him. She carried him in her arms into her house, where he lay without a sigh or a struggle, cold, pale, and death-like, for ten minutes: he then began to draw long breathes, to groan, and to open his eyes; when his elder brother passing, and hearing of the nature of the accident, went into the house from a common impulse of humanity, and found his little brother in this mangled condition. He called a sedan chair, and placing him on his knee on pillows, brought him to the Infirmary.

Vestingius told Bartholine another singular instance, somewhat of the same kind, of a woman who was wounded by her lover (out of jealousy upon the entering of a rival into the chamber) with a dagger, the point of which stuck in the scull: but this woman recovered; for though they could not at first extract the point of the weapon, yet, after some time, the wounded part of the cranium gave way of its own accord (probably by suppuration and caries); the point of the dagger loosened, and they got it drawn out with forceps. And J. Dom. Sala told Bartholine, That he had even seen a person live, with the point of a sword sticking not only in the bone, but in the substance of the brain itself, who enjoyed tolerable health, except that he had frequent epileptic fits. But how they could allow a man to continue in such a dangerous situation, with the point of a weapon plainly sticking in the brain, with epileptic fits, and exposed of course, upon the slightest irregularity, to be seized with paralysis and convulsion, and so to die, amazes me. Why, if it had been a thorn sticking under the nail of the great toe, they should have cut it out.

Fig. 12.

Fig. 10.

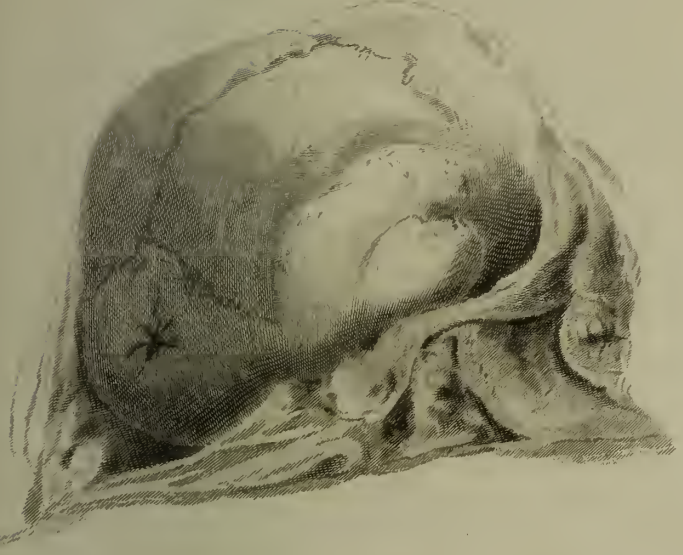

Fig. 11.

Fig. 13.

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By the time his father and mother had arrived, he was quite collected, and in his senses, he was sitting up, while his head was shaved, his mother took him upon her knee, and soothed him; he laid down his head upon her bosom, and cried; but he wiped away the blood carefully and nicely with his handkerchief; was perfectly collected and obedient, and neither cried nor struggled. The wounds were, one upon the left side, slight and superficial, from the grazing of one of the pikes; another in the right temple, or rather about the center of the parietal bone, very deep. The punctured wound of the integuments admitted a probe, which, passing obliquely backwards, encountered the edge of a deep depressed fracture: The iron point had not directly pierced the scull, but crushed and burst through the bone obliquely, and, by a lateral pressure, it had so bent down a piece of the scull, that the fracture was long and the depression broad; but the integuments were only slightly wounded, they were punctured, and not torn. The boy was in his perfect senses, without even that tremor or agitation which such an accident might occasion; no weakness of one side; no stupor; no vomiting; no dilatation of the pupil; no slowness nor pausing of the pulse, such as usually accompanies effusion of blood. I was averse from the proposal of opening the integuments, and ventured to prognosticate the worst consequences if a fracture, already so extensive, was trepanned, and the bones torn away: But the boy, though there was not the shadow of an ill symptom, was trepanned; a long incision was made: the crown of the trepan was applied where the circle is traced in this plan at (*a*) No. 12.: the two pieces of bone, (*b* and *c*), each half an inch broad and an inch long, were twisted and pulled away; two smaller fragments were loosened and pulled away by the help of the levator and forceps: all in short that was depressed was disengaged and separated; and the boy, whose condition was after the accident doubtful, lay now in a most perilous state: the integuments cut up to the extent of three inches; the scull opened to the same extent; the dura mater left to sustain alone the force of the arterial pulsations, the brain already protruding, even while the dura mater was still entire. I never, in boys, find the dura mater capable of supporting itself; wherever the openings are thus wide, it inflames, sloughs, gives way at one or more points, and the PROPER SUBSTANCE OF THE BRAIN, previously suppurated and ready to form a fungus, protrudes: so it was in this case, and the fungus is represented in the sketch, fig. 13. The boy's condition, while he lived, is explained in page 671 of this work; the dissection of his brain exhibited, along with the general phenomena there described, the following peculiarities.

" The chief disorder lay in the right hemisphere of the brain, though it was in part communicated to the left *. The left ventricle was somewhat enlarged, its surface irregular and soft, with suppuration, while a dirty greenish-coloured pus lined the walls: The inflammation, thus communicated to the left side, was universally diffused: the substance of the brain, in its anterior part, remained natural; the cortical and medullary parts were distinguished by the usual colours and forms, but the substance of the brain, where it approaches either inflamed surface, the inflamed surface, viz. of the ventricle, or the suppurated surface of the hemisphere, assumes a dirty olive green colour, which muddy and dusky green is the prevailing colour of the inflamed or half-gangrened parts. Immediately opposite to the wide opening of the scull, all distinction of medullary and cineritious substance ceases; the brain has degenerated into a confused mass, which may be represented, in a drawing or a model, by a ground of olive green touched with spots of vermilion, like extravasated blood. The dura mater covering the right hemisphere of the brain was much thickened and leathery-like; its vessels conspicuous, red, and turgid, and coated with a tenacious coat of pus, greatly resembling and in some degree partaking of the nature of coagulable lymph; but there was much unequivocal pus spread over all the hemishpere, reaching even to the basis of the scull. The most difficult and interesting part of the anatomical inquiry was that which related to the state and origin of the fungus: It proceeded apparently from the membranes of the brain, from the pia mater; it was elongated from the surface of the brain in the form of threads, the remains, I presume, of vessels which gave consistence and strength to what in other respects resembled mucus. The dura mater was perforated, but not round the margin of the circle made by the trepan, as if wounded by the teeth of the instrument; the openings were round and centrical in regard to the naked part of the membrane, and were filled by the protruding parts of the fungus."

I should add, That in taking the cast from this boy's head, which I did with my own hand, not trusting to a figure-caster, the fungus stuck firmly to the mould,

* The description of the boy's condition, from the moment of the accident to that of his death, is from my own notes, p. 671. The more particular dissection of the protrusion or fungus of the brain, which is now described, is from additional notes, made by my brother Mr Charles Bell. The first exhibits a general view of the inflamed brain; the second, a particular anatomy of the protruding tumor. And I recollect it was my brother's chief intention to ascertain, by a careful dissection, whether the vessels of such fungus were continuous with those of the pia mater or brain.

in consequence of its vascularity and connection with the brain; it was then (in pulling away the mould) that the tumor lost its form, but not its vascularity, for its vessels hung in long strings through the several openings of the dura mater: the sketch, No. 13. represents the head of this boy in the moment of death. Surely he had been safer if left untrepanned: I attribute his fate to the large openings, yet without the shadow of blame on the part of the operator, who proceeded according to the strict rules of surgery, and took no bones away but such as were loose. It is nevertheless a question, and ever must be, whether he might not have survived had his wound, shocking as it was, been left to nature.

Eightly. One principle, relating occasionally to every form of fracture; to the depression; the angular and fractured wound of the scull; the mere rima or fissure; nay, even to the slightest bruise of a bone, is this—that every such fracture is apt to become CARIOUS. When, by carelessness or design, a fracture has been quite neglected, or imprudently treated; when, along with a fracture or fissure, the scull has been grinded and bruised by a carriage wheel, or grazed and deadened by a musket-ball; when the wound and the exposed bone has been much neglected or much tormented, by the ignorant surgeon, the fractured part becomes carious; when the wound becomes pale and flabby, the bone still seeming to the touch of the probe bare and rough, or in part exposed, yellow, duskish, or inclined to blackness; when the patient sickens and becomes languid, with a furred tongue, a hot skin, and a febrile pulse, and a corded feeling within the head—let the surgeon no longer show his humanity or skill, by watching his patient, but make haste to perforate the scull: if he perforate early, he will find but a little cream-coloured pus upon the dura mater, which will granulate and reunite with the inner surface of the scull; but if he wait but three days, the ulceration will affect the brain.

Let this, qualified with such exceptions as your own good sense and experience may suggest, be your rule of practice. It is not by neglecting depression, which never is in itself hurtful, but by disregarding a carious bone, and the slight but mortal signs of internal suppuration, that many patients are lost. A little boy, L—— D——, of the age of Cameron, in going to school, was crushed betwixt a cart-wheel and the wall, thrown down, mangled, and carried home with a wide and lacerated wound of the scalp, and a very slight depression of the bone. The scull of this boy is represented in sheet 3. fig. 14. The integuments were lacerated and turned back, so as to display an inconsiderable fracture and slight depression in the fontanel, where the coronal and sagittal sutures

cross; the wound was but slightly lacerated, the fracture by no means desperate, and the depression harmless, for the boy was composed and perfectly calm. The integuments were cleaned and replaced; and for three weeks the boy enjoyed perfect health, the wound granulating and appearing to heal. All along, his danger might have been prognosticated from the state of the wound; for though it granulated, it did not heal; the lips were florid, but separate; the lower surface was quite detached from the scull, the bone rough, and the edges of the fracture, rough and carious, encountered the point of the probe: But in the fourth week his danger was declared, and the affection of the brain begun; he was feverish, had acute pain in the head, had frequent startings and aguish shiverings, and passed his nights without sleep: Not only was the state of the wound overlooked, and the first signs of internal suppuration disregarded, but though, on the twenty-eighth day, his headaches were aggravated, though he was seized with convulsion, became paralytic of the left side, and his pupils were dilated, no anxiety was excited even by these decided signs of suppurating brain; he was immersed in the warm bath, had a glyster administered, and, *to revive him from this debility!* had occasionally A LITTLE PORT WINE! Two days had the boy lain in this condition, before the fracture and wound became a subject of attention; then the scalp was, by cutting a few bridles of adhesion which retained it, thrown back, the scull was again uncovered as at first; a fracture, with slight and general depression, was plainly perceived; but a much more dismal appearance, in my opinion, was the blackness of the bone, which, in all the depressed part, and to some extent around it, was now discoloured.

Though the child had long been distracted with severe pain in the head, had been struck with palsy, accompanied with occasional convulsions, and now lay oppressed, with a dilated pupil, it was with difficulty the surgeon was prevailed with to look upon him with any degree of interest; at last he was induced to perform the operation of trepan, but with what views I never yet could comprehend: The case plainly required the cutting out of the carious bone; under that surely lay the pus; but, to my utter surprise, I saw the crown of the trepan applied at a considerable distance from the depression, manifestly with the purpose of applying the trepan, first, upon the firm bone, and then introducing the lever by that hole, and raising the depressed part! though unquestionably a part, thus slightly and generally depressed, was sufficient to bear the instrument. A part thus blackened with caries should have been cut out, and not sound bone trepanned to spare that which was diseased; and surely whatever matter

was to be found, the surgeon had reason to expect under the carious part; for the caries, being the cause of such abscess, must have been the center or focus of it. In compliment to the rules of surgery, and in contradiction to plain sense, the perforation was made at (*a*), at a distance from this depression, over which the lever, when introduced, had not the slightest power. Next was made another perforation (*b*), which approached a little more boldly towards the depressed part: The first perforation (*a*) was actually at the distance of two diameters of the trepan from the edge of the fractured and carious part: the second crown of the trepan was placed at (*b*), betwixt the first perforation and the fracture. Both the perforations were made in the *sound part of the bone*, which bled in the vascular scull of a boy as the gums do when scarified, and over *the sound part of the brain*, so that not a particle of matter flowed. This second perforation, though in contact with the fracture, was as unavailing as the first in relieving the depression, the sole object of the operation: at last the perforation (*c*) being made upon the coronal suture, near the vertex, and through the carious part of the bone, the matter spouted out, and the operator and his assistant eyed each other with a smirk of exultation at their success, perhaps of congratulation in having lighted so accidentally, so fortunately, upon a cause of danger which they were little aware of. This last perforation should have been the sole object, the beginning and the end of the operation, as it at once gave vent to the abscess, and cut away a part at least of the carious bone: It was, I am sorry to say, neither the one nor the other; tooth forceps and lithotomy forceps were called for, and all the intermediate points of bone twisted and torn away, the trepan holes and the carious depression being converted into one wide and circular opening, as large as the palm of the hand; without any proper fungus having formed, the brain, (still covered by the dura mater) protruded in a general way, and soon, by sloughy orifices forming, (as in the case of Billy Cameron), a fungus began to protrude, which was duly powdered with alum, till the seventh day, when the boy expired.

The lesson which this case illustrates is one of the most necessary in surgery, viz. the duty of observing the state of the integuments, the caries of the bone, and the first slight symptoms of disordered brain, accompanied with separation of the integuments from the carious scull: the imprudence of making large openings is also conspicuous, and the propriety of trepanning the depressed bone wherever it will bear it, since, while in giving vent to the matter, we cut away the caries: and finally, I

would have you on every such occasion not to think merely of vindicating yourself by adhering to the strict rules of art, but to reflect on the use and purpose of your operation, and to do boldly for your patient's safety those things which sense and experience dictate. Such ABSCESS of the brain often follows a neglected fracture, and requires a *trepan* to open it, in place of a *lancet*.—These are, I apprehend, the chief rules for the treatment of depressed and carious fractures.

DISCOURSE

DISCOURSE II.

ON THE STATES OF CONCUSSION AND COMPRESSION OF THE BRAIN; WITH EXAMPLES NARRATIVE AND DESCRIPTIVE.

To treat fractures, wounds, and other open and manifest injuries of the scull, prudently and skillfully may be thought difficult; but how to reason concerning those internal injuries which are hidden from the senses, and marked only by variable and uncertain signs, must ever be perplexing. Perhaps there is nothing more generally desired by the profession than some decisive marks, denoting the particular nature of that stupor in which a patient lies oppressed after a fall or a heavy obtuse blow. But there is no such sign: we are doomed to proceed in our profession always with a degree of uncertainty, and to regulate our conduct by a perpetual and attentive exercise of our judgment and senses. It is only by a deliberate and calm review of the circumstances attending concussion, that we can arrive at any thing like a conclusion; and, in the course of reasoning, which I am now to lay before you, you will, I trust, feel the advantage of those general views I have formerly delivered; for it is my object now to make a parallel betwixt Concussion and Compression, the Apoplectic and the Paralytic States of the Brain; to establish in short the relation of Medicine and Surgery: To be surgeons, you must be physicians; and, even though educated as physicians, you must still make yourselves acquainted with the details even of that profession which you are not to practice. It is shrewdly to be suspected, that a physician, who boasts of knowing nothing of our profession of surgery, knows little of his own.

To reason upon the cause of every phenomenon in the living body, is natural and unavoidable, and does by no means contribute either to multiply or confirm whatever prejudices we may have: It is only from refusing to reason that our worst prejudices have arisen; and prejudices of ignorance are infinitely more dangerous than the prejudices of those who, being willing to reason, are of course open to conviction, and inclined to enter into the discussion of whatever new views or unobserved phenomena are brought to light. Nothing perhaps can be more unmeaning than the word *Concussion*, which is not, in the common acceptation, accompanied with any conviction of the structure of the brain being disordered by the shock, the term implies a belief that the affection is of the nature usually denominated *Nervous!* that it is inscrutable in its nature! that, as we know nothing of the immediate cause, we can do nothing to recover our patient! that whatever phenomena we observe, are such as are usually designated signs of debility; and from this persuasion, and an indistinct and confused analogy, (as Mr Abernethy observes) *betwixt fainting and concussion, stimulants and wine*, the most dangerous of all medicines, are poured down.

If Concussion be indeed this inscrutable nervous affection, unattended with physical disorder, we must become mere spectators; there is an end of reasoning, and in such uncertainty it were better to refrain from practice. But, the comparing the brain with other parts and organs of the body, will bring to our recollection many consolotary circumstances, which will encourage you to believe, that here also our profession may be useful. What does a bruise, a shock, and a general injury, do to a limb? Does it produce any sort of disorder in a limb, which it may not produce in the more delicate substance of the brain? When a man is hurt by the oblique blow of a cannon-ball, or has his thigh bruised by riding furiously against a carriage, by a fall, or by a log of wood, a block of stone, or any heavy body falling upon him, what does he feel? nothing but numbness: the part is torpid; he hardly knows how much he is hurt; he is lame; and we can hardly believe that any internal or physical disorder has taken place so suddenly! yet, before he is recovered from his confusion, or is able to mount his horse, the limb is stiff and swelled; the swelling increases every moment; the suffusion of blood, under the transparent skin, shows, by the speedy discolouring of the part, that the swelling, (too sudden to proceed from increased vascular action) proceeds truly from blood extravasated by the ruptured vessels, and there is no reason to doubt that the swelling in the deeper parts is from the same cause: The vessels of the limb have given way in many parts; its cellular substance is choaked with blood:

If the suffusion be so universal and so great as to suffocate the arterial action, the limb never recovers, all living action stops, it gangrenes and dies: If the blood be injected in such a degree as to create only pain and disorder, the arterial action is rather excited, and heat, pain, redness, and suppurative inflammation take place: If the blood be less generally injected into the limb, it is more easily absorbed, and the swelling is resolved without redness or pain. Of this suite of phenomena I must needs remind you, before proceeding, to observe in what degree these appearances take place in shocks or blows upon the head, and in what degree they are likely to affect the function of the brain.

OF CONCUSSION.

THE patient who has fallen from a great height, and lies insensible from the shock, has sustained the principal injury in that system of vessels which, from all that I have related to you, is the most delicate, and the most susceptible of extravasation. Nor is there any mark wanting of extravasation, slighter or greater, general or local, having taken place in the brain: Nervous affection (if we are still to use this unmeaning term) might, for a moment, confound the function of the brain, as a man is not only stunned but sickened by a blow of the fist; but the patient, who has suffered a concussion, lies insensible, snoring, and with his senses oppressed, and is in a state resembling that of apoplexy or intoxication; his forehead is swelled, his eyes often closed, and his features deformed with extravasated blood; blood gushes at once from his nostrils, mouth, and eyes; his pulse is slow and pausing; his limbs and joints loose and relaxed; the pupils of his eyes dilated; his breathing slow; his whole body cold; you hardly know that he is alive, but by his groans. If blood has thus burst from every part of this system of vessels, is it likely that the brain has escaped? If the blood-vessels of the nostrils, of the throat, of the ears, have burst from the shock, and blood is also effused under the skin, is it likely that the delicate substance of the brain should escape the same degree of suffusion? It is indeed true that, when the patient dies, and his brain is dissected in that coarse and slovenly manner, which is but too common, and by boys who hardly know its natural colour and forms, it seems as if nothing had happened to account for the sudden death of the patient; and it is confidently reported so, because there is no fracture of the scull, nor any conspicuous effusion of blood: but when

a brain thus deranged is dissected by a master who, by judging what is likely to happen, knows what to look for; the phenomena, though little perceptible to an ignorant man, must be interesting to a thinking observer.

"A man (says Mr Abernethy having fallen from the roof of a brew-house, a height of at least eighty feet, had his fall broken by touching the ground first with his wrist, which was dislocated and mangled; his forehead next struck the ground, and his face was bruised, but his cranium was uninjured: He lay at first almost inanimate, cold, and with a feeble pulse: when he became warm, he had stertorous breathing, a dilated pupil, and a profuse perspiration; his pulse rose to 140, he recovered a degree of sensibility, his pupil contracted, and his eye-brows were drawn into a frown; but his pulse again subsided; the animal functions gradually failed; he died the following day; and his head was dissected by Mr Abernethy, who reports the state of the brain in these words: "On dissection, there appeared every mark denoting violent inflammation of the brain and pia mater, of short duration. The minute arteries of the pia mater were turgid with blood; in many places THERE WAS THE APPEARANCE CALLED BLOOD-SHOT, which was also to be seen in the lining of the ventricles. Dark-coloured, and in some places bloody, coagulable lymph filled all the recesses between the tunica arachnoidea and pia mater. On dividing the substance of the brain, ALL ITS VESSELS APPEARED AS IF INJECTED WITH BLOOD."

Every word of this report, (more impartial than any I could relate on my own authority,) conveys the idea of turgescence of vessels, and general cellular effusion, throughout the whole substance of the brain, and makes good the parallel betwixt that state designated by the term Concussion of the Brain, and the benumbed and torpid condition of a limb whose arteries are burst and cellular substance suffused by a blow: It is not possible to imagine circumstances more suited to support the parallel than that suite of phenomena which takes place in concussion. Recollect fully the doctrine I have formerly laid down, and you will comprehend at once all the phenomena which distinguish CONCUSSION from COMPRESSION of the BRAIN. "Every cause which affects the brain universally through all its parts, as turgescence of its vessels, or general suffusion of its substance, interrupts and disorders its functions; while a partial compression, as that proceeding from depressed bone, extravasated blood, or any thing external to the brain, affects its functions very slightly, unless the compression, though local, is such as actually to cause death." The patient who has fallen from a great height, or otherwise suffered that shock

which so deeply affects the functions of the brain, is found, when lifted from the ground, cold, pale, motionless, without pulse, without sense, and is as in a fainting fit; if he continues cold, and passes his urine and faeces involuntarily, he dies. The first signs of returning life are deep and oppressed groans, the cold sweat breaking on his temples, and a fluttering motion in the pulses: when laid in bed, when warmed and restored to life, the groans become more frequent, he seems deeply oppressed, he tosses his limbs from time to time; his face is flushed, his nostrils dilated, his breathing laborious and noisy, his pulse slow and heavy, and he has all the symptoms of deep apoplexy: By the second day his pulse has risen to 120; his lips are parched, his skin dry, his eye more open; he stares wildly, but is insensible; and being roused, he, after a short and confused struggle, and muttering, as in low delirium, falls down again into a heavy slumber, from which, if bled and purged profusely, and his head bathed with cold vinegar, the surgeon having the good sense to refrain from giving opium or wine, he gradually recovers. It would appear, from this series of symptoms, that whatever general effusion takes place in the moment of the shock, is slowly absorbed; and that the febrile inflammatory action, which such a state of the sensorium excites, in the days immediately succeeding the fall, is harmless: Yet not unfrequently there is a true Typhomania; the pulse rises higher, and throbs powerfully; and the patient, after long tossing and oppression, starts from his bed, strikes and struggles with his attendants, and subsides again into a state of torpor; but by profuse evacuations, and bold prescriptions, escapes the danger of an inflamed brain, though the action sometimes terminates in continued insanity followed by imbecility.

These successive states, first of coldness and stillness in all the vital actions, with oppressed brain, and next of high arterial action, accompanied with delirium, have always struck me, as intimating strongly the parallel (so natural in every other point of view) betwixt a *contusion* of a limb, or of any other organ of the body, and *concussion* of the brain: Nor am I over anxious, when I find my patient quite insensible, lying in a state of stupor, resembling intoxication, if that first stupor be followed by arterial action and the signs of inflammation, for then I know the oppression is from no local cause: nor am I alarmed when he becomes delirious, for that is a state little more than febrile, which I have usually observed to be a sure forerunner of recovery; there is in such case nothing essentially to oppress the vital functions, or to cause death.

OF COMPRESSION.

When, in place of general suffusion and disordered circulation, some greater vessel has given way, and either under the dura mater, or in the substance of the brain, there is a particular effusion of blood, the scene is very different from that now described: The patient, oppressed by an effusion of blood, is never insensible, (unless he is about to expire), and rarely delirious; his pulse never rises, but is slow, heavy, and pausing at every fifth stroke; his pupil is sometimes dilated; his one side usually paralysed, or at least still and motionless, while the other often shakes with a sort of tremulous convulsion, which returns at regular intervals, and is attended with a quivering and irregular pulse, cold extremities, and insensible evacuations, when he is about to expire.

Extravasation more frequently arises from a blow or fall upon a hard body, and is more connected with fracture of the scull than concussion, which arises rather from a shock than a blow: Extravasation is more of the nature of a local injury: the patient, when raised up, is cold, pale, and motionless, but to this no usual heat ensues; he tosses as under some oppressive feeling, and often lifts his hand towards the injured side of the head; he lies with his eyes shut, groans as from oppression, but is always sensible; stares at you when roused; answers whatever questions you ask rationally, but in monosyllables: he seems impatient when teazed with questions; his answers are pronounced with a sigh or a groan; he is correct in answering to the circumstances of his fall, even to the nature of the oppression he suffers, and to the part of his head that is pained, towards which he moves his hand, though irregularly, whenever he is desired: in his tossing he sometimes rises upon his elbow; when requested to rise, he sits up, and takes the drink which he calls for, but soon sinks down again into a slumber liker sleep than apoplexy, and tosses and groans more as his sleep becomes deeper: The oppression and tossing is inseparable from this condition of the sensorium, and the pulse is slow, pausing, beating no more than fifty in a minute, and interrupted at every fifth or sixth stroke, especially while the patient is lying in deeper slumber, or when

in particular danger. I believe I have rarely seen a patient, to whom operation or any kind of assistance could be useful, quite insensible from mere oppression of extravasated blood; and of this I am very sure, that I have innumerable times seen the patient whose extravasation was so great as to prove fatal, such as was found upon dissection to cover one entire hemisphere of the brain, retain his perfect senses, and recollect minutely the circumstances of his fall, with a consciousness all along of every thing that was said or done about him.

I have just described a condition which, I would fain flatter myself, can hardly be mistaken, which at least is not likely to be confounded with the total stupor of concussion. IN THE FIRST DEGREE OF EXTRAVASATION, the person lying oppressed with extravasated blood, is not insensible, but tosses and groans from oppression, replies when spoken to, feels giddy, and, when able to express his feelings, says that every thing seems to turn round; he pukes from time to time, and has a slow, heavy, and pausing pulse: If you add to these signs, that, in his tossing, you perceive that one leg or arm still moves, while the opposite arm and leg lie almost still and motionless, you will seldom be deceived; and finding these symptoms to continue for days, the oppression to become deeper, the vomiting to cease, and the pulse to decline in strength, becoming slower as it becomes feeble, it is your duty to apply the trepan, and often you are successful. These are the signs of slighter extravasation, which yet without the assistance of the surgeon becomes desperate: for, in a few days, the side opposite to that which received the blow becomes manifestly paralytic; and as the extravasation and oppression of the sensorium increase, the palsy is followed by convulsion; while the one side becomes paralytic, the other is seized with slight tremors, and soon after the pulse becomes weaker, though it can hardly become slower, the natural heat declines, the patient expires: Wherever such convulsion accompanies the palsy, it is too late to operate.

IN THE SECOND DEGREE OF EXTRAVASATION, when the patient is paralytic, or completely oppressed, from the first moment, and there is no perceptible interval betwixt the paralysis of one side and declining of the vital powers; when he lies oppressed and moaning, raises his hand frequently towards his head, but is not deeply insensible, nor has the pupil much dilated; if he speaks, when teazed, though slowly and difficultly, and then in a particular manner raises his hand to his head, the evidence of extravasation is complete, the patient is in the utmost danger, the operation should immediately be had recourse to, and perforating with a large trepan, and giving vent to the coagulated blood, which rolls out thick and black,

sometimes relieves the palsy, restores the senses, and finally saves the patient's life.

But there is A THIRD DEGREE OF EXTRAVASATION, invariably fatal; and I believe the symptoms I am now to describe indicate in general, that extravasation which either expands itself over the lower parts of the brain, or extends from the upper parts to the basis of the scull, raising the nerves from their origins and distending them betwixt the basis of the brain and the foramina through which they pass out. The condition I have here to describe is that of total insensibility and grinning convulsion; an insensibility unaccompanied by stertor or snoring, but, on the contrary, with a pale face, cold extremities, and a fluttering pulse; a convulsion agitating not one side, but chiefly affecting the features of the face, jerking the head back, and stiffening the neck: The convulsion resembles that of the locked jaw; and it is very distracting to look upon such a patient, for the symptom brings an absolute conviction to the mind of the spectator that the disorder is fatal.

The patient's condition may be thus characterised; he is taken up cold, insensible, with a dilated pupil, and hardly any signs of life, and recovers heat very slowly and imperfectly: after lying oppressed, groaning, deadly pale, with a dilated pupil, the extremities cold, and the eye-lid remaining raised as you open it, unless you lay it down again, he begins on the second day to be affected with convulsive twitches; the cheek is particularly distorted, the whole body is still and cold; the convulsion increases in violence, and returns with a degree of regularity every ten minutes or quarter of an hour: at each return of the convulsion he continues, while you can count two hundred or more, to have the cheek and corner of the mouth raised, the eye-brow and all the features of that side violently distorted, with spasmodic twitches, the neck rigid, the head jerked violently round and bent backwards upon the neck, with interrupted strokes; and each convulsive twitch is accompanied with a catch of the respiration, a distortion of the mouth, and with a noise of *hick! hick!* repeated at each twitch, while the convulsion lasts. It seldom continues long: On the third or fourth day the convulsions grow weaker; the extremities and the whole body become cold; the pulse, which is not at all to be felt during the convulsion, trembles during the intervals, and the patient expires.

These two states of CONCUSSION and COMPRESSION bear a strong analogy with the relative states of APOPLEXY and PALSY. CONCUSSION, there is every reason to believe, is not a mere nervous affection, else it could not be permanent! but a suffusion into the substance of the brain, resembling the ecchymosis or bloody suffusion of a bruised limb, attended with symptoms resembling APOPLEXY, and terminating usually in a gradual absorption and slow recovery; some-

times in high inflammatory action and sudden delirium, in Typhomania, or rather that alternation of Delirium and Coma, which is almost inseparable from such a state of the sensorium: While COMPRESSION, proceeding from extravasation of blood, is plainly PALSY; beginning in stupor, without insensibility, and ending in Hemiplegia and convulsions: but, with this special distinction, that Palsy, proceeding from rupture of vessels overcharged by the *apoplectic arterial action*, is a disease of the brain itself, is attended with destruction of the cerebral substance, and is thence incurable; while the Paralytic State, proceeding from a shock or blow, consists in extravasation, foreign to the substance of the brain, external even to the dura mater; is merely a local compression, not directly injurious to the cerebral substance, and thence is curable: the moment the extravasation is let out, the patient raises his eyes, knows his friends, and moves the affected side. The truth or probability of these parallels will best appear from some sketches and narratives of such accidents as you are likely to meet with in practice.

Being called to Hamilton, to visit a gentleman, an officer in the 7th Dragoons, who was supposed to have a fracture of the scull; I found that, in riding a wild horse, in the court-yard of the barracks, unaccustomed with the heavy bit of the cavalry equipage, he had checked his horse in rearing, and pulled him back, and the horse falling upon him, he was knocked down and struck to the ground with great violence, his occiput encountering the hard beaten gravel: He lay pale, pulseless, and insensible, was restored to heat very slowly, and continued in a profound stupor, snoring and motionless. I arrived the following day, and found him still insensible; his pupil not dilated, his tongue furred, his hand hot and dry; his pulse high, his face flushed; his looks, when roused, wild and distracted; he instantly, after being disturbed, fell down again into a state of stupor, and nothing could rouse him to any recollection of his situation, nor enable him to articulate even a monosyllable. Upon consulting with Mr Taylor the regimental surgeon, formerly of Mercer's Hospital, a man of the best education, and of strong good sense, we agreed, however unpromising his condition might pear to his friends, to report to Colonel Heul, That he was in no danger; that we should make no incisions; that, by profuse evacuations, this fever might be prevented from rising to delirium; that, after slumbering a few days, he would gradually recover his senses. Presuming, from this infallible mark of quick pulse accompanying the stupor, that the stupor was void of danger, I left him with confidence; and, by letters from Mr Taylor, had the comfort to learn that, after slighter dawnings of sense and reason, he was, by bleeding and

strong purges of calomel and jallap, perfectly restored, before the week had elapsed.

Concussion, in a greater or less degree, is almost inseparable from that kind of shock to which the head is exposed when a man is thrown from on horseback; sometimes it is accompanied with fracture or extravasation, and thence questions of great delicacy and difficulty often arise. The first head I ever dissected, after an accident of this nature, was that of a young gentleman, who having rode on a pleasure party to Roslin, exceeded in wine, was ill able to manage his horse, was thrown, and died on the fourth day: But in his scull was found not the slightest trace of fracture, nor within the slightest extravasation; nor could any peculiar appearances be remarked in examining the substance of the brain itself, except general redness of the pia mater, vessels extremely turgid, and many bloody points. Whence we perceive how narrowly those escape who have violent concussion; they invariably die, if the pulse continues low, or is at any time intermitting.

Another young gentleman, on his return from a like excursion, was thrown from his horse, lay in a death-like stupor for ten days, during which period the blood, which had at first gushed from his nose, mouth, and ears, continued to flow unremittingly from his right ear. The shock, which thus bursts the vessels on these delicate surfaces, cannot but have a like effect on the delicate cerebral substance within: The senses and intellect suffer from this suffused state of the brain, but the haemorrhagy from these vessels probably saves the internal part of the system from any extreme violence; at all events, it is certainly observed, that such issue of blood from the mouth and nostrils, though a sign of great violence, is favourable to the patient's recovery; and if any such haemorrhagy is dangerous, it is that from the ear, for there is little doubt that it must come from those internal vessels which traverse the ear: Yet this young gentleman entirely recovered.

In such cases, wine and the heat of exercise, youth, and health and strength, prepare the vascular system but too well to assume an inflammatory action, and to re-act powerfully; thence it often happens that, in place of lying like these young men, torpid and oppressed, the patient bursts out of bed, struggles with the attendants with maniacal strength, and is very difficultly subdued, and in great danger of ultimate violence to the structure of the brain from such high and continued vascular action. This I saw conspicuously exemplified, in a young man, uncommonly athletic, accustomed to violent exercises, who, being thrown from his horse when riding extremely hard, not brutally intoxicated, but furious with wine, lay

for five days in a state of profound stupor, from which he, after staring, struggling, and muttering, wakened to such a phrenzy that four stout men with difficulty held him down in bed, and yet he recovered, and reformed, and now lives in perfect health.

These familiar examples, such as you will daily meet with in practice, cannot perhaps be more happily closed than with a short case from Jacotius; it stands recorded in his commentary on the third aphorism of the first book of Hippocrates. " We have observed (says this author) of those who have the brain injured, some dying suddenly, others lying oppressed and snoring, while others have blood issuing from the nose, ears, and mouth, and yet live: One patient of mine having lain speechless a long while, and apparently dying in convulsions, started suddenly from his bed, in the middle of the night, fell upon the attendants with maniacal fury, and felled every mother's son of them to the ground, except a Franciscan monk, a lusty able fellow, against whom he maintained a long battle, with feet, and hands, and talons: the monk called loudly for help to those who were already felled, but in vain; they lay strewed on the ground, while he struggled alone with the furious patient, who seized alternately clubs, fire-irons, piss-pots, whatever he could lay hands on; and laying hold at last of an iron stanchel, he tore it from the window with incredible strength: He had now nearly levelled the monk with his fellow watchers, and would have beaten out his brains with a stone of forty pounds weight, which he lifted and aimed to throw at his head, when the monk, breathless and exhausted, but desperate, collected all his strength into one last effort, and gave him a kick on the cods, which brought him to the ground. This man, says Jacotius, I entirely and perfectly cured *." This example of horrible phrenitic delirium, I quote in proof of what I have constantly remarked, that delirium is the least unfavourable symptom and the most curable.

* " Nos observavimus, quibus cerebri partes sauciatae essent, alios repentè mortuos: alios soporatos cruentatis etiam auribus et naribus diu mansisse, tandemque evasisse: quendam Arelate, cum diu obmutuisset, crebrisque convulsionibus prehensus supremum, ut videbatur, diem conficeret, subito è lecto noctu exilientem, ac furore percitum in eos, qui aderant impetum fecisse, prostratisque aliis, cum Franciscano valente et nervoso, diu pugnis, unguibus, calcibus certasse, quem frustra caeterorum opem implorantem, ita miseris tractavit modis, ut arreptâ primum cruce, dende matulâ, fuste, ferro etiam incredibili vi è fenestris detracto, hominem non sine ejulatu penè oppresserit: ac certè sublate lapide quadraginta pondo, tandem oppressisset, nisi Franciscanus in summa desperatione collectis viribus ictum gravem aegri pudendis impegisset, quo ille humi concidit. Hic tamen praeter omnium opinionem nostris auxiliis adjutus tandem convaluit.—*Jacotius Comment. ad aph.* 3. *lib.* 1. *sect.* 3. *Coac. Hipp.*

The more fatal accident of extravasation is attended with symptoms less terrible, and with a comparatively slight affection of the intellect and senses: I have been confounded often to see the patient recollected and sensible, under a compression decisive as to cause paralysis of one side: SOMNOLENCY, not STUPOR, is the mark of this state.

John Hutchison, a sailor lad, of twenty years of age, fell down stairs, and lay in a state singularly characteristic of compression of the brain: His condition was described to me by a good woman, who was very careful of him from the moment of his fall, for he was the companion of her son, who had followed him to sea; when the one boy was gone abroad, the other would not stay at home. This lad, on a visit to his father, perfectly sober, going negligently up an outside stair, fell, but whether three steps as a workman reports, or the whole flight as this woman's husband believes, we could never certainly learn: This good woman, who lived in the house under his father, was abroad at the time, but her husband heard the fall, so violent was the shock, and running out, carried him up stairs with the assistance of a mason who was working in the close. When she came home, she went up to him, and found him lying oppressed, as in a deep sleep; she asked him often what happened, and how he was, which he answered always in two or three words, passionately and impatiently pronounced, "that he was better," "that he would soon be well," "that he would lie and sleep a little," still he begged that they might let him lie still and sleep. His tongue sometimes faltered; he answered best when most roused; there was a cold sweat all over him; his face was exceedingly pale, he yawned perpetually, and always when offered drink, &c. cried, "let me lie and sleep:" He vomited frequently during the two first hours after the fall: his left side, his left arm at least, was plainly powerless, he never moved it in concert with the right: he lay in a slumbering condition, groaning and tossing as if oppressed; muttering, but always conscious of his condition; complaining of his head, and able to answer: When this good woman set him up in bed, or when he raised himself to pass his urine, he complained often of his breast and sometimes of his belly, but continually of his head: while quiet he had no snoring, and slept like a child, till after being bled by the surgeon of his ship, from which time he enjoyed no more of that placid sleep. On the third day, this woman brought him up a bason of warm milk, and he seemed to like it; she raised him in bed, he sat up and took the bason in his own hand, and when she gave it him,

saying, take it my good lad, he answered, " I will, I will, but do not trust to my hand only;" yet, with her help, he held it to his head, and drank it off. He complained continually of his head; and in whatever way roused or disturbed, he begged they would let him sleep; " if they would let him sleep a little longer, he said he would go down to Leith and go on board."

This good woman went up to see him at seven in the morning of the fourth day; she found him still slumbering, and continually complaining of his head; suddenly he was seized with a strong convulsion, raised himself a little in bed, and thumped incessantly with his hand upon the side of the bed, striking with the paralytic arm as well as with the sound, and all the while he kicked and struggled with his feet; at last his left hand was suddenly seized with a violent spasm, the wrist was strongly bent down towards the fore arm, the fingers stood out rigid at right angles with the hand, and from that moment he never moved that arm more, his hand continuing rigid in this distorted form. But the convulsion did not then cease; it continued from seven in the morning till eight; notwithstanding these terrible convulsions, and this spasmodic palsy of the left hand, he retained his senses, spoke sensibly when roused, supported himself in some degree in bed, complained sometimes of his belly and of his head; and when asked about the state of his bowels from the time of his fall, answered collectedly and correctly. This was on Thursday, the fourth day from the fall: On Friday morning, I saw him, for the first time; and in the evening by six o'clock he was dead.

In the last day of his existence, he still retained his senses; he lay in a perpetual slumber, but had no puking; his tossing and anxieties were very distressing to see; his face was deadly pale, his right eye stood immoveable when opened, the pupil being widely dilated; while his left (though his left side was paralysed) remained irritable and moveable, the pupil of it was contracted, and it turned quickly from the light; his pulse was small, quick, and fluttering, like that of a sick child; and the vital motions so affected, that it appeared manifestly that they could not go on; his extremities were cold, and I judged him dying: but nothing surprised me more than to find, upon lifting his eye-lid, that I could rouse him to speak; when I bade him put out his tongue, he did so, and when I spake loud and impressively, and asked where his pain was, he raised his right hand, though in an irregular way, and laid it upon his head."

" This very stout young man expired about six o'clock on Friday evening; and the following evening we found, upon dissecting his head, no tumor, nor even a bloody effusion in the integuments, but in the cranium a large and wide fracture, traversing the parietal bone, and running through its whole length: unconnected with that, on the vertex, was a small fissure, penetrating only through the first table: under the centre of the parietal bone lay a very large coagulum of blood; it was as large as the whole hand, bating the points of the fore and mid fingers, and thicker than the fleshy part of the palm; it was very firmly congealed, and came off in one cake like the placenta of a foetus, leaving a very deep depression in the brain, into which you might have laid the back of your hand."

It is not my intention, however useful it might be, to accumulate authorities for what I know to be a plain fact, or to multiply description of a state which I have given a sketchy outline in my general description, and which I would preserve clear and distinct: But I cannot refrain from quoting, on my margin*, one or two observations, to prove the same important fact of the intellect being little affected by extravasation, even by that which is to be fatal; while I go on to represent to you the condition of the patient while labouring under symptoms undoubtedly mortal.

* Fontanus relates the case of a boy having extravasation under the scull, in the following terms. " An orphan boy, about fifteen years of age, lost his tame sparrow, which flew away from him and lighted on a wall: The boy tried to entice the sparrow, and, failing in this, began to climb the wall; the sparrow flitted along, the boy followed, till at last he fell and struck his left temple; but he got up; and being asked by his playfellows whether he was not hurt, he fell a laughing, looking up waggishly to the wall from which he had the fall, which was fifteen feet high. He went to school as usual, and at supper he ate heartily, and then went to bed: but, at midnight, he awakened in the utmost terror, vomiting a mixture of bile and blood; before morning he was delirious. The governours of the hospital were called, who gave him every little assistance in their power. I, being physician in ordinary to the charity, was sent for, and in my turn called the surgeons. They examined, but felt no contusion nor depression of the cranium. I ordered him to be bled, to have a glyster, to have the head fomented. On the following day, a tumor appeared over the place of the temporal muscle; an incision was made in it, down to the muscle, and we found the scull bruised and fissured in various directions; yet there was no one piece which could be poised out: The trepan was naturally thought of, but was manifestly unnecessary, as the blood exuded through the fracture: when the free flux of the blood was stopped, we had recourse to the trepan, but with no good effect, for the boy died."

" A very old man was carried into the hospital, who, after a fall, lay insensible and convulsed: no relations accompanied him to tell what had happened: Two sons, who afterwards came, were at once brutal and perverse, seemingly indifferent to his sufferings, and yet sternly and impudently refusing to allow us to proceed in the way that prudence and the necessities of the case required. He was a very old man, with bald temples, a naked scalp, and not the slightest appearance of injury on the head: He lay in a deep stupor, immoveable, except when agitated with a convul-

Upon opening the scull, besides the fracture and these fissures, we found, on the very opposite side of the scull, two counter-fissures, of a triangular form, the cause of which we cannot pretend to explain. The dura and pia mater were tense as a drum, while the very capillary veins were so turgid that they resembled rather the veins of the hand than the veins of the brain; and betwixt the scull and the membranes was found much coagulated blood."---*Fontanus.*

" A coarse athletic man (says Wepfer) in cutting a mill-stone, fell from the gallery where he was working, at no great height; but he lighted on a beam, and struck the occiput a little behind the ear, upon the corner of the beam: he lay pale, cold, and speechless, as in a faint, and upon recovering complained only of pain on the occiput where it struck the beam. The beam being large and round, the surgeon found neither tumor nor sign of depression, not the slightest wound; the pained part could be covered with the flesh of the thumb, and was painful when touched: The surgeon bled his patient, applied his ointments, and put a twisted towell in his teeth, to try, by twanging it, whether there was a fracture; he gave him hard bodies to chew, and struck with an iron upon his teeth, as surgeons used to do to discover fractures. The patient walked about sometimes, sometimes sat on a stool by the fire; lay with his head low; never vomited; blood sometimes flowed from his mouth; in walking, he carried his head to the right side, with slight marks of the staggering vertigo (vertigo titubans); he had slight ringing in the right ear, but he saw well, spoke well, was silent only because it was his way; slept little, but had no delirium; ate little, but had no thirst. The pain of the affected part never remitted; but, with such slight signs, the surgeon, although a dexterous operator, could not think of trepanning. From the 25th to the 28th of November, he continued in this condition, when, about six in the evening, being in his entire senses, and with all his bodily powers perfect, he began to breathe with a sort of stertor, as if the bronchiae were clogged with blood or mucus, yet without dyspnoea; and, about eight o'clock, he lost in a moment all sense and motion, and in a quarter of an hour expired.

" On dissecting the head, there was found a slight depression, with fissure in the occiput, and upon lifting the scull-cap, two long and gaping fissures, and betwixt the dura and pia mater much black and congealed blood, and a proportioned quantity of serum, chiefly about the basis of the brain, extending round the cerebellum to the occipital hole, and round the cerebrum, even to the os frontis, limited entirely to the right side.---Vide Wepfer, ob. viii.

sion, which returned every ten minutes, and became more frequent as his strength declined; his eyes, which were closed during the interval of stupor, opened when the convulsion approached, and stood staring wide, with a much dilated pupil: first the cheek and features on the right side of the face were drawn up into a ludicrous grin; then the neck stiffened, the head was jerked backwards, and the jaws worked backwards and forwards with a violent spasm; the tongue and throat were also affected, and the lips made that kind of noise that follows when we draw the breath through the closed teeth, to prevent the saliva escaping by the angle of the mouth: after continuing two minutes or more, the convulsion terminated, with deep groans, in a state of stupor. His unnatural sons would not suffer us to touch one hair of his head; and on the evening of the second day, when he died, they came, with a mob of vagabonds at their heels, and carried away the body, with a degree of precipitation which inclined us to believe that there was something particular in the manner of this blow which they were afraid dissection might reveal."

Not a moment should be lost when such symptoms appear: The extravasation may be in the ventricles, on the basis, or within the substance of the brain; and if so, the man is gone beyond redemption; but if it be only on the surface, and there is a possibility of saving his life, it can be only by immediate operation: When the symptoms of extravasation are accompanied with fracture running downwards towards the basis of the scull, we may despair of doing good.

"A big and strong man, a common labourer, fell down three steps of a stair; but there was every reason to believe he had struck his head on the edge of a bucket, hitting that part where a projecting iron hinge joins the iron handle with the tub: When raised up, he was pale, cold, and pulseless; cordials were given him, he was restored to heat, and then blood was observed to distil from his nostrils and right ear. Being carried into his own house, he passed a disturbed and restless night, till towards morning that he enjoyed a calm sleep. He lay still and motionless the second day; his eyes seem dead and glazed, the pupils of both were dilated, contracting only with the very strongest light; his jaws seemed clenched, his teeth closely shut, his lips retracted and turned backwards, uncovering the teeth as in grining; he breathed slow and heavily through his nostrils; he was paralytic of his left side, had involuntary stools, and passed his urine in the bed.

"Yet upon being stirred and roused, he looked up wild and bewildered, and had frequently during the night attempted to get out of bed; his pulse was weak

and fluttering, and his body cold; he was not so insensible but that a purge operated briskly, though then and alway his stools past unconsciously: his face was pale and shrunk; he lay but a few minutes in one posture; he then turned and struggled, and a sort of foam issued from betwixt his closed teeth, while his lips were retracted into a grin; his cheek was distorted, and his jaws worked perpetually, so that you heard his teeth grinding. He was permitted to lie too long in this desperate state unassisted. When my brother and I saw him together on the third day, the paleness of the face and coldness of the body had increased, the stools were involuntary, the pulse extremely feeble, almost imperceptible; we called immediately a consultation, rather to witness what was to be done than to give advice in a case so plainly desperate: perceiving, though there was not the slightest swelling, a degree of livor on the temple, my brother made an incision, and, turning down a large angular flap of scalp and temporal muscle, uncovered the temporal bone down to the zygoma, and in doing so felt his knife grate against a rough and wide fracture; the flesh of the muscle being cleared away, a very rude fracture was seen to run horizontally through the parietal and temporal bones, its branches passed down under the zygoma to the basis of the scull, blood oozed through the chinks of it, and a large trepan being applied directly above the zygoma very black grumous blood rolled out. He died in about fourteen hours."

Your own good sense will suggest to you that, besides those decisive conditions of the intellect and bodily functions which I have endeavoured to characterise, there must be many intermediate states, extremely perplexing and difficult to resolve into any simple principle; in all things I wish to leave you to your own discretion; in many, I am sorry to say, you can have no precise rules from any teacher, but must trust to your own penetration and judgment: experience, or, in other words, the habit of reasoning, so as to infer from external signs the kind and degree of internal injury, will enable you to resolve the most anomalous symptoms; but that condition of the brain in which general suffusion of blood is followed by inflammation, delirium, and death, that condition which is marked by convulsions and spasms resembling those of Hydrocephalus, and with a pulse indicating nothing of oppression, is of all the anomalous states of the organ the most frequent. I cannot remember that I was ever more perplexed how to act than in the following case.

"A poor boy, of thirteen years of age, in scrambling with his playfellows, on a Sunday afternoon, about the ruins of a house which workmen were pulling down, fell from one of the windows, a height of fourteen feet, and struck his forehead a-

gainst a beam: There appeared upon the forehead, close to the root of the nose, a soft elastic tumor, and a general suggillation of blood, which entirely closed the eyes; he was stunned, and lay in a death-like stupor for a quarter of an hour, but entirely recovered: he had been universally bruised, for he vomited blood, which also flowed in a full stream from his nose; his pupil was contracted; his pulse, regular and strong, beating 90 in a minute. Next day the vomiting continued; his pulse was still full and strong: upon being bled the vomiting ceased, and the pulse subsided both in strength and frequency: the night he passed tolerably, though restless, feverish, and pained; he often carried his hand to his forehead, complained of the pain, and sometimes talked wildly through his sleep. The second night he passed in great confusion, with much delirium, and when most rational he complained grievously of his head, while a thin and bloody serum distilled from his right ear, with great pain behind the ear, where it would appear he had sustained a degree of injury, which might well happen in a fall so irregular among stones and beams. On the third day, the tumor of the forehead subsided, and the eye-lids opened: on pressing the tumid part of the forehead, he complained of intolerable pain; his pulse continued high and rapid; the bleeding, purges, leeches, and other sedatives, were renewed; his sleep during the night of the third was more composed and natural, and he had no unfavourable change, till ten o'clock in the morning of the fourth day; then he became very hot, feverish, and restless; vomited much; the vomiting was excited by repeating the cathartic, and even by taking the acidulated drinks which were ordered him; at four in the afternoon he was seized with extraordinary contortions, and strong spasms of the abdominal muscles, with violent tremors of the whole body, and grinding of the teeth: His breathing was affected by the violence of the spasms in the abdominal muscles; it was noisy and laborious, but not slow nor oppressed, and the pulse beat 120 in the minute: Towards afternoon all parts of the body were at times convulsed; he howled as if distracted with pain of the head, and his eyes squinted horribly; he grinded his teeth continually, his features were distorted, his arms and fingers stiffened and crooked with cramps and spasms: his condition this day and evening reminded me of the condition of boys in the worst stage of acute hydrocephalus or inflamed brain. At ten at night, he had, after suffering thus violently all day, subsided into a sort of stupor, without vomiting, but with a rapid pulse.

"The night of the fourth was restless and miserable, but much of it he passed in a state of stupor: On the fifth day the swelling of the forehead had entirely flattened; that of the eye-lids was gone; nothing remained to denote the place of

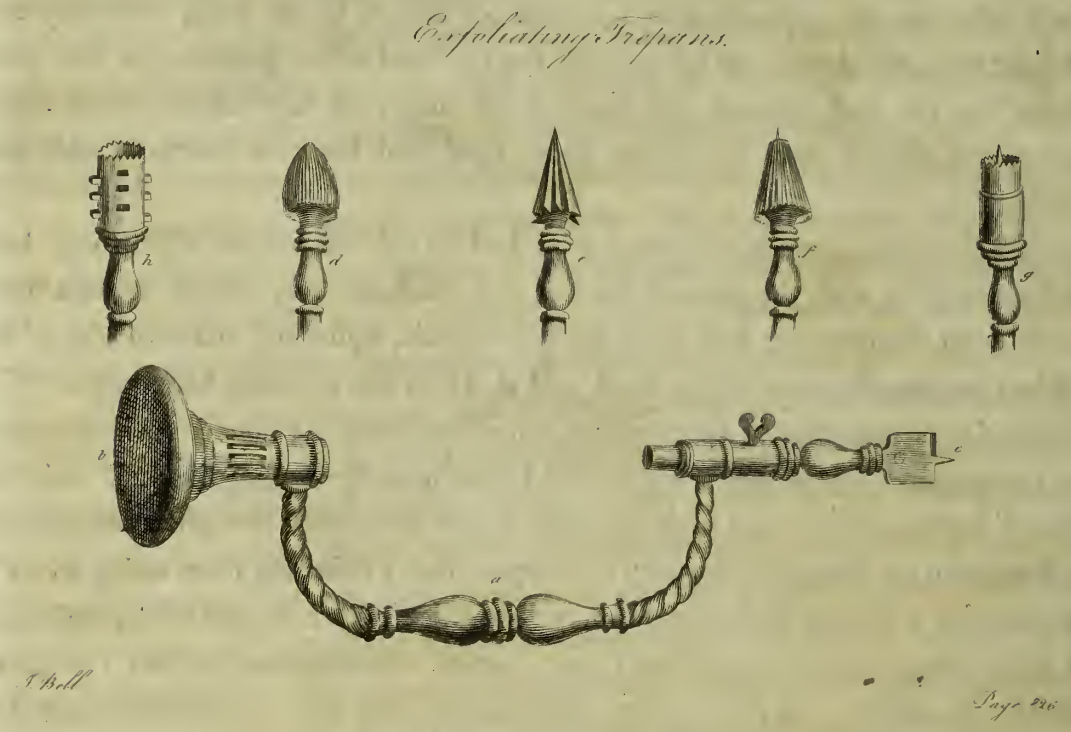
injury, but the general suggillation of blood with which the forehead and eye-lids were discoloured: At five this evening I found him quite sensible, complaining of excruciating pain in the head, screaming with the torture, and his eyes horribly distorted, especially the right one, which was turned downwards and inwards till the iris was almost hidden under the inner angle of the eye. This night he had much delirium, and while conscious complained of pain of the head, especially behind the ear; for though he felt pain of the forehead when pressed, he felt pain behind the ear and through the head at all times: he howled much this night from eleven o'clock, and his thighs were rigid and his toes crooked with the spasms.

"On the sixth I found him dead; he had raved the whole night long, had cried continually with the pain of his ear and forehead, was seized betwixt two and three in the morning with such universal spasm, squinting, and howling as he had had on the afternoon of the third, and at six in the morning he expired."

Here was no symptom of extravasation nor of compression; none but of inflammation; and against inflammation what could I have done by tearing the scull with the trepan? It was not for want of those marks which are usually thought a vindication by those who are impatient to apply the trepan, that I refrained from ussing it, for I distinctly felt a fracture in the forehead, accompanied with a degree of depression in the place of the frontal sinus; but from a perfect consciousness that my operation could do no nothing but increase the inflammation, and from a persuasion that the fracture was a concomitant merely of a more fatal disease: I reflected seriously, and found myself assured, from the symptoms, that inflammation was the principal disease; that fracture at this point could be attended with no remarkable depression; that if it was extensive, it must run through the basis of the scull; and I had the satisfaction, melancholy though it was, of discovering, on dissecting the boy's head, not the slightest extravasation upon the dura mater, but the surface of the brain universally reddened, and its vessels turgid, and there was a wide fracture, beginning at the orbitary plate of the frontal bone, and running quite across the foramen magnum into the occipital bone; but without any remarkable appearance either under the bruised part of the forehead or behind the ear.

I will no longer detain you, but hasten, after a short section on the mechanical part of your duty, on the operation of trepan, to lay down rules for your general conduct, not without a confidence that, among the variety of delineations

of the disordered conditions of the brain, narrative or descriptive, which I have laid before you, you will be able to find rational parallels for a great proportion of the accidents which may overtake you in your future practice.



Of the Operation of Trepan.

At the head of this little chapter of instructions how to use the surgical instruments, I have placed those of a conical form, now obsolete; at the foot of it, those used by the modern surgeon: If you conceive, as I trust you do, the essential purposes of the operation, I have no fear of your using them with sufficient dexterity and address; and my instructions on this head shall be few, plain, and simple.

The instruments of the old school, represented in this plate, belong chiefly to the operation of exfoliating carious parts of the cranium, as those represented in p. 764; viz. the chissels, mallets, and googes, relate to the operation, now justly reprobated, of enlarging the openings made by these small and conical instruments, or breaking up the intermediate points of bone, so as to lay many perforations into

bne. The instrument (*a*) is that which is distinguished by the name of TREPAN; and in using it the head (*b*) is pressed by the chin of the operator, while he turns the instrument, as a carpenter does his auger, with rapidity and good effect; but as I prefer deliberation in an operation of this nature, I use the trephine. The point (*c*) is that peculiarly designated the exfoliating trepan; for, by cutting off the surface without perforating, it shaves away whatever depth of the bone seems corrupted; and it is with such an instrument, though unquestionably endangering the dura mater, that the older surgeons completed the whole perforation. (*d*) and (*e*) are various forms of exfoliating trepans, designed for perforating the bone from point to point, in order to permit the granulations to shoot up through the outer table of the scull, and cover its surface when in danger of caries. (*f*) is that small trepan which was in use when Godfredus perforated the Duke of Nassau's head twenty-seven times, and is formed thus conical to prevent its perforating too rapidly, or passing in suddenly, so as to endanger the dura mater; while (*g* and *h*) are two forms of the crown of the trepan, in which any such accident is prevented by permanent or moveable stops, by projections of the crown of the trepan itself, or by pins laid across it, to measure the depth to which it is to be permitted to penetrate.

But we do not now prevent the integuments from reuniting with the scull, nor conceive exfoliation to be an essential part of the cure: the operator trusts to his address for completing the perforation, without plunging through the opening, hence the crown is made cylindrical, not conical, and sufficiently large to give a free issue to matter or blood without repeated perforations, or the help of chissels and googes. The simple form of the modern instrument marked (*i*), p. 833 turning in half circles with the hand, is found to perforate quick enough, and to be extremely manageable, since the saw is easily inclined so as to continue its semicircular incision on that segment or side of the perforation which is least cut. The forceps (*k*) take out the piece of bone, either by their circular lips (*l*), corresponding with the circle of the crown, being introduced into the circular cut to seize the sawed piece, or by the points (*m*) being introduced to poise it out. The lever (*n*) is sometimes useful in poising out the piece separated by the saw, but the point of it is too blunt and round to be very serviceable, in any but its proper office, which is to poise and raise up whatever depression of the scull requires to be elevated; and the levator and the forceps are equally used in twisting or poising out loose pieces of the scull.—These are the simple instruments now laid in the operating case; along with which

you are usually provided with a brush to clean the teeth of your saw; a second head or crown, of the same diameter with the first, that while the one is blunted, or when it is unscrewed for the purpose of being cleaned, the other may be used; a knife is also laid in the case, for dividing and raising up the scalp, and often a RUGINE or triangular instrument, like a caulker's iron, for scraping away the pericranium, which I never do, for I find it unnecessary, and do not think it right nor safe.

1. *For the disposition of your Instruments and Dressings*—They are to be laid in two small plates, within a doubled table-napkin, the napkin being pinned so over the bottom of the plate that it may not shift, nor any awkward accident happen: On the first plate is deposited, within the folds of the napkin, the trephine, the center-pin of the crown, the key to unscrew it with, the lever, the forceps, a toothpick, and a brush; on the outside of the cloth is laid a knife and sponge, soaked and squeezed, so as to be ready for use. On the plate of dressings are to be laid, lint nicely folded into smaller and greater compresses, very soft; a little square piece of oiled lint; a broad compress of four or six folds of old linen; a double-headed roller, three ells long, pinned at each end, so that when lifted, however hastily, it may not run down; and in the cloth that covers the plate should be stuck one or two needles, of the smallest size, threaded with a double thread waxed.

2. *For the Posture of your Patient*—If composed and sensible, and capable of sitting erect, you should place him on the ground, as a dentist places his patient: The assistant, who is to hold him, should have a board laid across his thighs, the patient's shoulders fixed between his knees, and the patient reclining his head upon a pillow laid upon the board; the assistant should lay his hands gently over the head so as to steady it, and in such a manner as to use, without change of posture, greater exertions if required: Where the patient lies insensible, he should be moved towards the side, or towards the head of the bed; his head laid on a pillow, steadied by a board under it; unless the couch on which the patient chances to be laid is itself sufficiently firm: a bed never is.

3. *In Cutting the Integuments*—The first step of your operation, you lift from the outer cover the knife and the sponge; the sponge, small and compressible, you hold in the palm of your left hand, under the ring and little fingers; you lay the mid-finger, fore-finger, and thumb of the left hand broad upon the scalp; you feel with the point of the left fore-finger, and by it guide your knife through all parts of the incision. *First*, If the scalp, having been once detached to a great extent, is re-

united, but over a carious bone and suppurating brain, the hollow integuments admitting the probe to turn to a great extent over the diseased scull---you take, in place of the round edged scalpel, a blunt pointed bistoury, and running it along, you at one stroke disengage the flap of diseased integuments, and turning it down see the whole extent of the dry, yellow, and blackened bone: your perforation should be central in respect to such caries. *Second*, The scalp having risen in form of a puffy tumor over a contused part of the cranium, you make, with the round edged scalpel, not a crucial incision, for that makes four small angles in the scalp, the raising up one or more of which displays but little of the diseased bone, but an incision in a tripod-like form; then the three points being dissected away from the scull make a very large opening, and even two only of the points being raised they make, as being two thirds of a circle, a very free opening: here too the state of the scull marks the danger to the brain; but in place of being yellow, rough, or blackened, it is usually only dry, not shining, nor brilliantly white, not attached to the periosteum or integuments; sometimes it is spotted or tinged with yellow, and devoid of circulation, and does not bleed when scraped with the point of the knife. *Third*, When after a dreadful fall, the scull is cruelly fractured, pieces beaten in, and the fissures wide, circumspection is so natural, and you can so distinctly feel with the point of the left fore-finger those asperities and openings, through which your knife might plunge into the dura mater, that I need but to intimate the danger. But, *fourthly*, When from a desperate fall upon the steps of a stone stair-case for example, the patient lies in a deadly stupor, cold, pulseless, moaning, the integuments never rise into a tumor nor become ecchymosed, except very slightly; they remain entirely flat for days, because the man is almost dead; the hemiplegia alone, with some slight blemish on the scalp, directs you on which side to operate, viz. the side opposite to that which is palsied, and from the convulsed or dying state of the patient you must do so quickly. The surgeon in such case, operating without a certain knowledge of the state of the scull, is in danger of plunging his knife unawares through a wide fracture. I have witnessed this disaster; let such incisions then be done carefully.

Allow me to add to these particulars a few general instructions. Do not seek to pursue the several limbs of a fracture, for to these your operation does in no shape relate; but seek the central point only, where the weapon or sharp stone has penetrated, or where the depressed angle is kept down by the firm and sound bone. Do not seek to scrape the bone, that you may trepan easily; I never, in

amputation or in trepan, found the soft parts entangle the teeth of the saw: In trepanning, I only cut away that cellular substance into which the extravasated blood is strongly injected, sometimes solidly impacted, and no farther than to procure a distinct view of the fractured pieces. Do not lay pieces of lint on the integuments, entrusting them to awkward assistants to hold them back while you perforate; for it is the sensibility of the integuments that makes the patient cry, resist, and struggle, which at once impresses the spectators with horror, and brings the reproach of cruelty on the surgeon, who must complete his operation in the midst of such cries: If you would avoid this unseemly scene, use spathulas or flat plates of iron, such as Mr Croker King calls defenders, to hold aside the integuments, and the perforation, which should be slowly and deliberately performed, will not seem tedious nor cruel.

In Perforating the Scull---Ascertain first the place most fit for perforation, viz. on the angle of depression, and in the line of the fissure where the fissure is wide and gaping: on the broken bone, if it be firm, on the sound, if it be so unsteady as not to bear the pressure of the center-pin, or the working of the saw; in the middle of the carious portion, when there is caries without fracture; and anywhere on the side opposite to that paralysed, but especially a little below and to one side of the centre of the parietal bone, when there is reason to believe the brain oppressed by extravasation, without any visible injury to mark the place.

Lift first the crown of the trepan you mean to apply; press it firm to the bone, and make one or two turns in order to mark the centre of the circle, by penetrating with the center-pin a little way: Next dismount the trepan head; take the triangular perforator, and having fixed it in the shaft, bore with it a central hole, for the center-pin, deep enough to hold it securely while you perforate: then mounting the crown of the trepan again, place the center-pin of it in that hole, and begin to saw: in cutting with the trephine, which turns in half circles, observe well the way in which the teeth are set, for they are set obliquely; you may be turning and twisting it, and that very vigorously, as I have seen some surgeons do, without cutting more than a right-handed person would pierce a cork by turning a left-handed cork-screw: as your trephine turns but half circles, you must inevitably cut deeper on that side of the circle towards which the hand turns; you must therefore probe frequently (especially when there is much bleeding, or when you are sensible of having cut deep) with the tooth-pick; and when you feel that you have penetrated on one side, CHANGE YOUR POSTURE, turn half

round the patient, which, by giving your hand a new inclination, sets it right for cutting what remains, which, in such delicate circumstances, and having so nearly completed the perforation, must be cautiously done and slowly.

In the course of perforating, while you probe with the quill, you give the crown of the trepan to your assistant to be brushed, or to be altogether changed; and when you are satisfied of the depth of your perforation, he, in returning it to you, wipes away the saw-dust with the same brush.

I seldom have completed the perforation, never have got out the trepan circle sticking in the crown of the trepan, but have sometimes poised it out with the handle of the scalpel, or the pointed extremity of the forceps marked (*m*). While sawing, whether in trepanning or in amputation, never think to overcome difficulty or resistance by pressure, but when you feel opposition cut lightly, and turn the saw nimbly, lighten your hand when it threatens to stop; never in sawing a long bone expect to loosen the saw by pushing and wriggling, but by withdrawing it, nor in trepanning by pressing onwards, but by turning the trephine half round backwards. Choose trepan crowns with the sides grooved and sharpened as well as the points of the teeth, for that kind of saw cuts wider as it goes deeper, and works the whole circle of the bone large and free for the trepan to move in.

5. *In respect to the Object of the Perforation*—You will find that extravasated blood rolls out spontaneously, in black and firm clots, through the trepan hole; and from dressing to dressing is easily hooked out, with an armed probe, or washed out with tepid water, the dura mater coming gradually into closer contact with the scull: Pus flows out still more easily, and multiplied operations for either purpose (of letting out blood or pus) are extremely imprudent; to repeat the perforation is sometimes necessary, on account of a great depression attended with manifest danger, where the edges of the depressed portion are fast locked under projecting corners of the firm scull, and the lever being introduced first into one, then into the other perforation, the depression is raised, but never without great force, usually a loud noise, and sometimes, as I have argued, with unjustifiable violence, insomuch that on many occasions, especially where the depression is flat, extensive, and having probably no offending points, I would rather leave it unreduced: Unless in depressions of a singular and dangerous form, punctured fractures, and those where, from their peculiar form, there is strong reason to suspect spiculae, I am not curious about depressions, nor over anxious in raising every point.

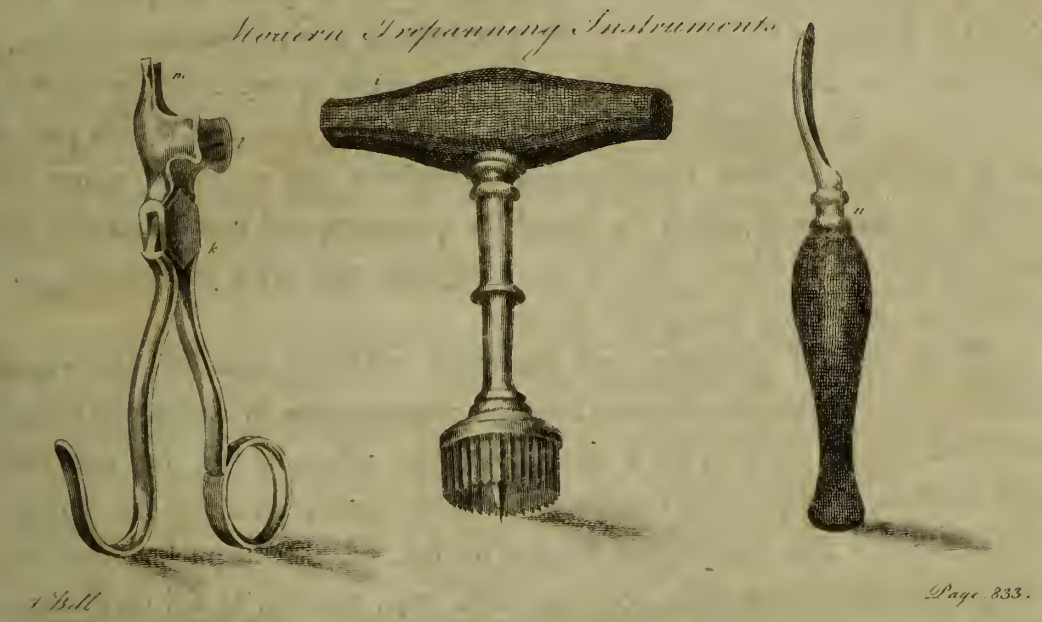
6. *In respect of Dressings*—I would intreat you to consult your own good sense, rather than hearken to the common ignorant advice of laying merely a piece of oiled lint on the wound, and over that a poultice. The old practice of cutting a circular piece of cloth as a syndon, and cramming it under the scull to support the brain, and leave room for matter and blood flowing out, I entirely disapprove of, but neither can I approve of leaving it quite unsupported; in short I dress the trepanned scull, as I do every other wound, nicely and careful: first, I lay the edges of the scalp smoothly together, sometimes stitching it with one or two points of the needle; then I lay upon it a small pledgit of oiled lint; next a small and rather firm compress of lint; next a general compress over the whole of that side of the head; and finally, I roll the head gently, but steadily and somewhat firmly, with a broad roller, and put over that a thin linen cap, lightly tied under the chin.

I allow no poulticing, except what is necessary to bring off the first dressings; and no washing nor curious cleansing of the wound, which I wipe slightly, and dress with very little ointment, almost dry: when blood still exudes, that makes an exception, being a special case; and when a fungus threatens to protrude, and even where only the sound but granulating dura mater projects through the trepan hole, I find it necessary sometimes to depress the dura mater, or push aside the fungus, to let the matter, confined from dressing to dressing, flow out; then, contrary to my usual practice, I think it right to dress morning and evening.

When, in the course of the cure, fungus protrudes and fills the opening, and the confinement of matter causes stupor and hemiplegia, and the inflammation of the brain, cries and convulsions, I reckon my patient lost; but I am proportionably more diligent in my methods of procuring a free efflux of the matter, and I think it better to shave off the protruding fungus than to apply escharotics, which I have usually found hurtful.

It is invariably found that noise, heat, wine, passion, and other exciting causes, are fatal to those who have suffered the operation of trepan: The confusion of a storm, after a battle at sea; the renewal of the engagement; the hour of firing the batteries in a besieged city; the intrusion of unwelcome visitors in the chamber of a private person; quarrels, intemperance, or venery, have in many instances brought on inflammation of the brain, such as has proved fatal to those far advanced in their recovery after this dangerous operation; therefore let them be

kept low, still, quiet, with a loose belly, a perspirable skin, little light, and few visitors, and no conversation but such as is composing and chearful.



Aphorisms, or Rules of Practice, deduced from the foregoing Discourses.

We have examined in detail every point of practice, and are now arrived at the conclusion of these Discourses, in which it is natural to recapitulate whatever is important, and ascertain whatever rules should particularly dwell upon your memory. This task, could I entirely acquit myself of prolixness in these discourses, might be spared; yet it will be useful, I doubt not, to explain in short Aphoristic Rules what an experienced surgeon would naturally do in any given case.

1. Above all things I counsel you to beware of precipitation; the only fault which can incline the surgeon to conceal the circumstances of his private practice, or leave upon his mind any lasting unhappiness: I intreat you on every new occurrence to think deliberately, judge soberly, and act gently; however urgent a case may seem, be in no haste to operate, take time to consult, and rest assured that Nature will often perform a cure while you are deliberating upon an operation; be also assured that you can never fail, in the worst cases,

to foresee the patient's death, by his coldness, paleness, convulsive motions, and involuntary stools: if these signs have not yet appeared, you have time for a few hours deliberate reflection, if they are already begun, you have then least of all any motive for precipitate measures, you are surely too late, the patient must die.

2. Fractures and injuries of the head are more frequent in public hospitals, where the friends of the patient, or the spectators of any unfortunate accident, leave him almost inanimate, perhaps with only some slight apparent injury of the head, while there is some serious damage to the brain, the nature of which you are ill able to develope, without knowing how the patient was struck or where he fell: let your first step be to collect the friends or spectators, and inquire into the circumstances of the fall or blow. Let it be an especial rule with you, never, in these cases, to do any thing precipitate or rash.

3. Every man of prudence and discretion, while he examines the wound and reasons on the symptoms, inquires into the circumstances in which the patient was hurt: whether by a fall or by a blow; whether, when he fell, he was drunk or sober, helpless, and pitching headlong, or in his senses, aware of his danger, and by extending his arms breaking the force of the fall: whether he pitched headlong over a rail, or tumbled down stairs, touching each step: whether he fell on plain ground, or on a declivity, and if he received a blow, whether it was struck by accident or by design; at arms length or close; with a heavy weapon or with a sharp one; by a feeble man or a strong; by a drunk man without aim or force, or by an angry man, in the height of rage, and with full effect.

4. There are certain kinds of accidents which import danger, each according to its peculiar nature; as A CONCUSSION, A CONTUSION, A WOUND WITH A SHARP WEAPON, A PUNCTURED WOUND. Writers on jurisprudence have long distinguished these kinds of wound, of which the danger is in some immediate, while in others it is deferred till the fortieth or till the hundredth day, and have been accustomed to affirm that the more the scull is fractured the less the danger, the breaking of the scull deadening the force of the blow. Of all the quaint reasons which authors have given *, not one is true; but yet it is a fact, that the man who has an

* The French surgeons have been accustomed to say, that the more the scull was fractured the less the danger: they imagined that the giving way of the scull saved the brain. One of their most celebrated surgeons says, If you take, for example, the stave of a barrel in both your hands, and try to break it by striking it on the ground, if it break by the blow, the shock terminates at the place where it breaks across, and you feel no unpleasant sensation; but if the stave continue entire and resist the force, the impetus with which you strike it upon the ground is reverberated to your hands, which are benumbed and pained.

extensive fracture of the scull escapes, while he who has no fracture dies. It is not because the yielding of the bone lessens the force of the blow upon the organ which that bone protects, but because concussion is a more dangerous injury than fracture, even though accompanied with deep depression of the scull: there is great danger in the case of concussion, though there be no fracture! there is little comparative danger in fracture when there is no concussion! when, from the nature of the fall, the concussion is great, no degree of fracture can lessen the danger, for the danger lies in the concussion or injury of the brain which is produced by a fall, not in fracture, which affects only the scull, and is occasioned by the blow. If a mason fall from the tiles of a house, or a sailor from the yards or rigging of a ship, and fracture his scull, the greatness of the fall lessens in no degree the violence of the concussion; the extent of the fracture marks rather a probable concussion, of which, if it be great, the patient dies: but if the tiles fall upon the mason, or the sailor is knocked down by the falling of a block and tackle, a great fracture does not cause an equal degree of injury, much less if he is knocked down with an handspike, and still less if his scull be but cut with a cutlass; the fracture may be in such cases great, and the concussion and consequent danger slight: in short, the scull is most fractured by those blows which are least injurious, and least injured by those general shocks which cause the most dangerous concussions and extravasations in the brain.

5. As a bruise is worse than a wound, and a sprain or laxation of a limb more distressing in its consequences than a fracture, so is concussion of the brain more dangerous than wounds or fractures of the scull: to the distinctions I have hinted at, I should wish to remind you of one which I have remarked: if by a fall your patient lie in a state of stupor, it may be from *Concussion*: if, after a smart blow with a bludgeon, not heavy nor depriving the patient instantly of his senses, it must be from *Extravasation.*

6. It is not with every kind or degree of stupor that an experienced surgeon is alarmed, he is accustomed to distinguish many kinds, as well as degrees, of that affection: the stupor may be that of *intoxication*, which, by the smell and the vomiting, he often is able to distinguish, and never is afraid to leave the head of the patient untouched till the longest period of intoxication (if it be intoxication) and all its consequences have expired; or it may be that of *slight concussion*, which, being attended with no oppression of pulse, nor suspension of breathing, is soon resolved by the natural force of the circulation: or it may be that stupor which, in

old age, generally follows a blow or fall, without indicating, as far as I have observed, any permanent injury: But if the *stupor*, though slight, is accompanied with *vomiting*, and *a slow intermitting pulse*, there is reason to apprehend the most imminent danger.

7. Nor does every degree or kind of delirium alarm him: delirium, arising after stupor, is a favourable sign: A wound of the scalp is often followed by *erysipelatous swelling*, and a short and harmless delirium: A patient, thrown into an hospital with wound of the scalp, is often seized with sudden *rigors*, vomiting, high fever, and delirium, but these are the symptoms of *hospital fever* merely, and might as well be superinduced after a wound of the finger as after a wound of the scalp: One who has formerly suffered much from fevers, or *who has been insane*, is more apt, as I have known in several instances, to awaken in a state of *phrenzy*, after lying some time under the stupor of a blow: These are not dangerous cases of delirium; and though stupor, insensibility, rigors, and other marks of suppuration or of effusion of blood, may be motives for applying the trepan, DELIRIUM, as far as I can recollect or imagine, never is.

8. I believe the danger to be prognosticated is very nearly in this gradation: *Stupor*, though deep, and to the tyro seemingly very dangerous, is not a cause of immediate alarm to the experienced surgeon: *Delirium*, succeeding such stupor, shows that the vascular action is begun, and the oppression at an end. *Slighter somnolency*, free from stupor, in which the patient has his senses, (though inclined to sleep), but with a heavy, oppressed, and intermitting pulse, is extremely alarming, and requires the trepan: *Stupor*, accompanied with dilated pupil, and *palsy of one side*, indicates the most imminent danger, yet such as is often relieved by the trepan. Stupor, in which the *face is pale*, *the extremities cold*, *the pulse* not heavy and labouring, but *quick and fluttering*, especially if attended with palsy of one side, or slight convulsions agitating the features or the limbs, is a state altogether to be despaired of: yet perhaps it is even here our duty to operate, but without hope.

9. The *prognostics from tumors*, I must remind you, are still more interesting; for any peculiarity in the tumor indicating the death of the bone below, more certainly foretels danger to the brain than the most formidable fracture: *First*, Where the *scalp merely* is wounded, perhaps *punctured*, but no tumor ensues, the patient is often affected with spasms in the face, and the most ludicrous contortions of the mouth; this is a symptom much resembling that contraction which follows

the wounding of a nerve in bleeding, and, like it, requires an incision. I have at this moment, under my care, a little boy, of ten years old, who, having fallen over a stair-case in swarming the ballustre, was taken up apparently dead, has lain for two days in a state of deep stupor, is now entirely recovered from it; he has his mouth turned more entirely to one side than I ever saw it in a paralytic, and though able to run about among his play-fellows does not expose himself among them; this, I have promised confidently, (because I have often seen it) will go off.—*Secondly*, *Erysipelas* often seizes the scalp after slight wounds, extends over the face and ears, closes the eye-lids, is attended with smart inflammatory fever and delirium, but subsides in a few days.—*Thirdly*, *A bloody effusion*, if the blood be in great quantity and the effusion permanent, is sometimes dangerous to the scull; but I must remind you of a danger of another nature, viz. of a feeling as if of depression of the scull, so particular that even the experienced are apt to be deceived: But an experienced surgeon is in no haste to make incision into such tumor, even though the patient is vomiting, and in a state of stupor; these usually are but the first consequences of the injury, and, like the tumor, vanish. I have seen extravasation so extensive as to fluctuate from ear to ear, and yielding so as to admit the finger to feel depression of the bone, yet the whole has been absorbed.—*Fourthly*, The most portentuous tumor is the least formidable in appearance; for it is one which proceeds neither from extravasation nor inflammation; it is neither red, inflamed, fluctuating, nor extensive, but arising from the death of the cellular substance next the bone, and from the impossibility of the dead surfaces renewing their adhesion, thence it is *Emphysematous*, *puffy*, *small*, *circumscribed*, not painful: is accompanied with rigors or febrile shiverings, and starting or nervous tremblings; confusion of head, and feebleness of body and mind: it is the most desparate disorder with the slightest symptoms: suppuration of the dura mater is begun, and if, upon the slightest intimation of this kind of danger, the patient be not trepanned, he dies.

10. As your preceptor, I am much more jealous of your being found wanting in judgment than in skill: Your operations, I doubt not, will be performed with address, but I am truly anxious that your address should be reserved for occasions of real danger, and that the powers of nature should never be anticipated, nor interrupted, by any rashness of your's.—*First*, Be not too confident in promising a speedy recovery, even in slight and cutaneous wounds, for the bone, though not wounded, may be deadened by the blow; but lay the edges together, and stitch them lightly and

gently to procure reunion: dress the wound dry with lint, court-plaster, and a sprinkling of hair-powder, which, by caking with the blood, keeps the edges of the wound in close and nice contact: and watch your patient's condition constantly, especially where the wound has been made with a bludgeon, a stone, or any blunt and heavy body.—*Second*, Be not afraid of an open though apparently a desparate wound, even when the scull is cut or fractured, even "where the splinters of it lie pashed upon the dura mater:" there is in such a case undeniable danger, since the bone is wounded and all the parts inflamed which defend and lie in contact with the brain; but such open wound, though wide, is often less dangerous than a slight contusion; it is but *a compound fracture of the scull*, and you have no warrant for doing any thing which you would not do in *a compound fracture of any other part*: when I spoke of Pariée's operation on Captain Hydron, and of bone reuniting with bone, I meant but to illustrate a general doctrine, not to announce a rule of practice: I advise you, on the contrary, to pick away carefully every fragment of the scull, to dissect away whatever little fragments you may find adhering to the scalp, and to lay down soft and sound integuments only upon the wounded scull and exposed dura mater.---*Third*, Be not careless of cleansing the scalp and laying it nicely and smoothly down, because of my having proved to you that ragged integuments or scalp, having even its inner surface ingrained with mud and dirt, has adhered, for such proofs were but meant to illustrate a general principle, to show how tenacious both the scull and integuments are, of life and circulation: to lay them down ragged or foul were the height of presumption, and a most culpable carelessness; pick the surfaces, cleanse them with the sponge, do every thing to entitle you to success; when you stitch the lacerated parts together, do it lightly, and dress the edges dry; do not, in your anxiety to cleanse them from sand or mud, wrap the head in a poultice, expecting to unite the parts after suppuration is begun, for after suppuration they curl backwards and retract; they never, as far as I have seen, can be laid together again, but heal with a gap equivalent to an actual loss of substance: Having stitched the integuments, watch the state of the wound diligently, and the instant you observe the stitches overstrained by the swelling of the scalp, or can perceive that matter is confined, the bone bare, and the probe admitted under the diseased scalp, lay the wound open, and then use a poultice, and wait patiently the granulation of the naked bone, or the signs of internal suppuration, to direct your future steps. --*Fourth*, Be upon your guard against the irretrievable fault of making incision into the integuments when they are entire, however

distinctly you feel a fracture or depression through them, for it is wonderful how happily the hurt parts heal and the extravasation of blood is resolved when the parts are kept entire; the making an incision in such a case is converting a simple into a compound fracture, with all the dangers of it; nothing can vindicate you in taking such a step but the most unequivocal proofs of a concomitant extravasation of blood, viz. oppression, somnolency, a heavy pausing pulse, a dilated pupil, and palsy of one side: make such incision (the integuments I mean being uninjured) only after great deliberation in adults, and in boys never, or almost never.---*Fifth*, Be not too rash in entering upon an operation, merely because the patient lies in a state of stupor or breaks out into delirium; those are the cases which least frequently require the trepan: and when you are entered upon an operation, be not too particular in raising every point or piece of bone that either seems or is really depressed: but above all, be not too late in operating when there is reason to suspect a suppuration of the dura mater; make it a principle, whatever the occasion may be for using the knife or saw, to be *sparing of the integuments*, for the loss of them affects the scull, to be *still more sparing of the scull*, for it supports the dura mater, and to think with the utmost reluctance of *puncturing the dura mater* strong as the suspicions may be of blood being extravasated under it, for, like a second scull, this firm and strong membrane supports the brain after perforation, and when it is punctured the brain is deprived of all support, and I have never failed to see it protrude: I will not disguise from you that this operation of puncturing the dura mater is sometimes successful, that it is reported so by creditable authors, but it is my duty to warn you that I have always found it fatal.

11. In respect to the medical treatment of your patient, I must remind you, that the first moment of stupor, coldness, and paleness, requires cordials; but the reaction that follows, requires that the powers of the circulation should be repressed: and I must also remind you, that such accidents happen chiefly to workmen, vigorous, strong, and healthy, full of blood, and often in the prime of life, that though there are many who boldly deny the use of bleeding, they speak from theory, while none dare neglect it who are acquainted with practice: many times the patient lifts his eyes and moves his limbs while the blood is yet flowing from the vein, and many are thus recovered who otherwise would never move them again: Bleeding is useful in all contusions, falls, and blows, to arrest the progress of extravasation; but where extravasation has already taken place, and one side is palsied, blood should not be too profusely drawn away, lest the strength suddenly sink: the brain being already compressed and

the vital powers low, it is peculiarly dangerous to draw away much blood: In Concussion, which is an apoplectic state of the brain, consisting at once in fullness of vessels and general exudation, bleeding relieves the oppression and promotes absorption: in stupor, with a heavy pulse, throbbing gradually stronger and stronger, and increasing at the same time in velocity, bleeding must be used to prevent the reaction rising to delirium: and when delirium actually rages, and the patient starts from his bed, and strikes and struggles, it is most eminently required to save the organization of the brain from the intense action of its own vascular system: frequent bleedings, drastic purges of calomel, and cold applications, and cool air, are useful; blisters and opium, doubtful in their operation; and all other stimulants, as wine, volatile alkali, &c. quite improper.

I am now, gentlemen, to take my leave of you, which I do with this consolatory reflection, that I have endeavoured, sincerely and soberly, to fulfil my duty to you in every point; and indeed I trust that you share this feeling with me, and will not forget the hours we have passed together, nor find them unprofitable in your future course of practice. It is possible that the rules which I have just laid down for your conduct, in special cases, may have qualified, corrected, and defined many imperfect conceptions, and may serve to concentrate your more diffused knowledge, and make it practically useful. May I be permitted to wish, or to hope, in the simple and dignified words of Bacon, That Providence may have enabled me, through you, to become a means of alleviating the sufferings of our fellow creatures, and the miseries inseparable from human nature. "Quamobrem quum haec arbitrii nostri non sint; ad Deum Patrem, Deum Verbum, Deum Spiritum, preces fundimus humilimas, et ardentissimas, ut humani generis aerumnarum memor, et perigrinationis istius vitae, in qua dies paucos et malos terimus, novis suis eleemosynis per manus nostras, familiam humanam dotare dignetur."

FINIS.

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